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ABSTRACT

This outline, for the course numbered B-28, is designed for use in teaching apprentice pipehangers who are working with submarines how to interpret piping and hanger blueprints accurately and to visualize complete hanger assemblies, piping symbols, and the locations of the items discussed on the blueprints. Addressed in the individual lessons of the course are the following topics: understanding and using the 688 Standard Cross-Referencing System, reading configuration drawings, locating various hanger assemblies on blueprints, understanding and using piping symbols and references, and using the TRIDENT Class Cross-Referencing System. Each lesson contains some or all of the following: lesson objectives, a list of materials required, questions and answers, definitions, technical drawings, and instructional text. (MN)

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B-28

PIPEHANGER BLUEPRINT
READING

DIVISION OF VOCATIONAL-TECHNICAL SCHOOLS
CONNECTICUT DEPARTMENT OF EDUCATION

1983-1984

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COURSE TITLE: PIPEHANGER BLUEPRINT READING

COURSE NUMBER: B-28

PERFORMANCE OBJECTIVES: The student will be able to accurately interpret piping and hanger blueprints and readily visualize complete hanger assemblies, piping symbols, and the locations of items discussed.

PREREQUISITES: PH-1

TEXTBOOKS: B-28 PIPEHANGER BLUEPRINT READING

DRAWINGS:

688 CLASS

256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F
2355-202 R/H, 6353-591 R/Z, 2285-213 R/F,
2744-51 R/J, 2744-33 R/H, 2740-377 R/K, 2285-237 R/C
2285-238 R/C, 2300-543 R/N, 2300-544 R/P,
2300-547X1,

TRIDENT CLASS

2620-286-10 R/N, 2620-286-11 R/K, 2620-286-12 R/M,
2620-286-13 R/H, 2620-286-14 R/G, 87524-9071 R/K
87524-4006 R/D, 87742-1702 R/G, 87742-1701 R/G
87522-2122 R/D, 87522-2123 R/D, 87522-2124 R/D
87744-3002 R/G, 87744-3004 R/G, 87742-1302 R/E
87742-3104 R/F, 87742-3103 R/P, 87742-3101 R/E

B-28 Pipehanger Blueprint Reading

Lesson 1

Materials Req.

Handout ~ 688 Class Cross Referencing System

Dwgs. 2355-202 R/H, 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F

Student Material List Answer Sheet

Part 1 of 3

Instructions:

Discuss Cross Referencing Using H/O only

Part 2 of 3

Instructions:

Issue plans listed on lead sheet of H/O. Follow the format shown on H/O using standard plans.

Part 3 of 3

Instructions:

Completely identify hanger H-5 using cross-referencing system without use of H/O. Student Material Answer Sheet will be used for answers.

688 STANDARD CROSS REFERENCING SYSTEM

PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMBLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAIN THE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS. FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF 688 HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

688 HANGER DETAIL

2355-202

688 HANGER STANDARD DRAWINGS:

216357	255454
256373	256372

TO BE TURNED IN AFTER CLASS !!!!

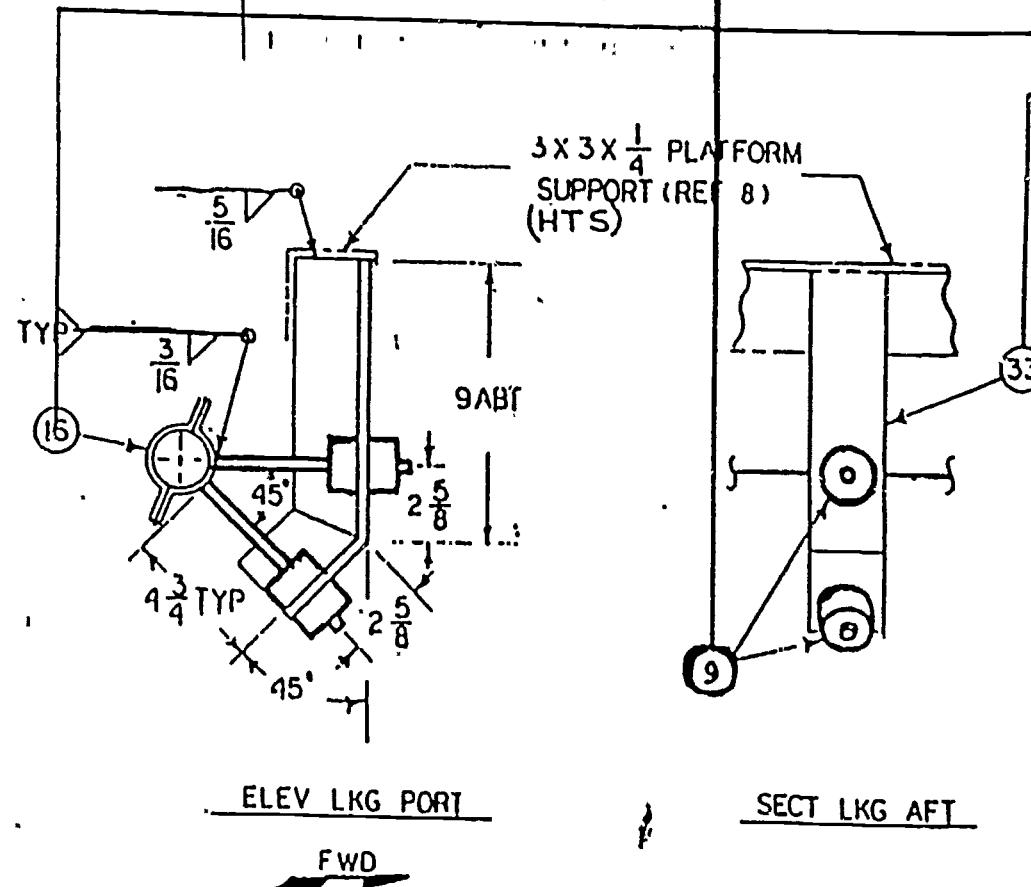
NOTE: Index is a good time saver.

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2	REVISIONS	
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7	ASSEMBLY-HANGER H2	
8	ASSEMBLY-HANGER H3	
9	ASSEMBLY-HANGER H4	
10	ASSEMBLY-HANGER H5	REF. F
11	ASSEMBLY-HANGER H6	
12	ASSEMBLY-HANGER H7	
13	ASSEMBLY-HANGER H8	
14	ASSEMBLY-HANGER H9	
15	ASSEMBLY-HANGER H10	
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35	ASSEMBLY-HANGER-H24-6-H25	REF. C
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40	ASSEMBLY-HANGER H30	
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43	DETAIL RUBBER BLOCK H23, H24 & H25 & H26	
44	ASSEMBLY HANGER H34	
45	ASSEMBLY HANGERS HG-A & HG-B	
46	ASSEMBLY-HANGER H25 & H26	

- NOTES
1. Starting with hanger detail plan 2355-202
 2. Go to index and locate the hanger in question and sheet No.
- NOTE: Always look in the index hangers are not always listed in order.
- NOTE: Ref. Block shows you all related drawings to this plan.
- START WITH H-5

REFERENCES			
NO.	TITLE	REFERENCE NO	DWG NO
1	PP ARR ELEC & AUX FR COOL TO & FROM AIR COMPRESSOR PLAN	516-0152071	2355-101
2	MOT. NOTES FOR DELOS & MAT'L SUB STRUCTURE (NOX-NUC)	815-0151139	0180-346
3	PAINTING SCHEDULE	605-0103198	2388-1
4	PIPE HANGER DETAIL & DESIGN INSTRUCTIONS	—	2355-58
5	SPI STRUCTURES-SPPOOL WID RESILIENT PIPE HANGERS	—	—
6	PLATFORM OR STRUCTURE 78-82 UL ER	103-0158611	1080-401
7	RESILIENT MOUNTS FOR PIPE HANGERS-ASSY & DET	—	216357
8	IRR PLATING UL FR 78-82	603-0155839	1080-59
9	FON-LP AIR SYSTEM ER	113-0158117	1220-1498
10	NEO PLATE HP AIR COMPRESSOR	516-0153270	6351-18
11	TAKE DILGE COLLECTING SYS ER FR 70-82 &	113-0159033	1110-501
12	SOUND DAMPING INT PRESS NULL AFT FRAME 65	601-015554110	2020-36
13	HIP AIR COMPRESSOR	—	6351-81 81
14	FON - H.P. AIR DRAIN SEPARATOR E.R.	113-0157052	1220-2215
15	NEOPLATE H.P. AIR FILTER, COOLER & MOIS. SEPR.	516-0152589	2210-050

1. Remember your theory.
2. The description of the part is as follows:
3. Hanger H5



**HANGER H5
CONSISTING OF:**

ITEM NO	QTY	L/M SHNO	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6

NOTES

1. Remember your theory.
2. Item 9 consists of (Mount) (Rod) (Nuts)
3. For further information go to Ref. Block in the upper right hand corner of this page.
Item 9
QTY 2
L/M Sh 6
4. Go to Sh 6 find Item 9

PRIME COAT: ZINC CHROMATE
SEE NOTE 1G

NOTES

1. L/M gives you description and Ref. Drawings.
2. The description of item 9 is 50# unbonded MTS
3. For further information go to Ref. Block for plan numbers to locate all the parts to MTS.
4. Ref. Dwg. 216357 SH 19 Assy 97A.
5. Proceed to proper drawing and Assy.

NOTE: Always read into the Remarks Column.

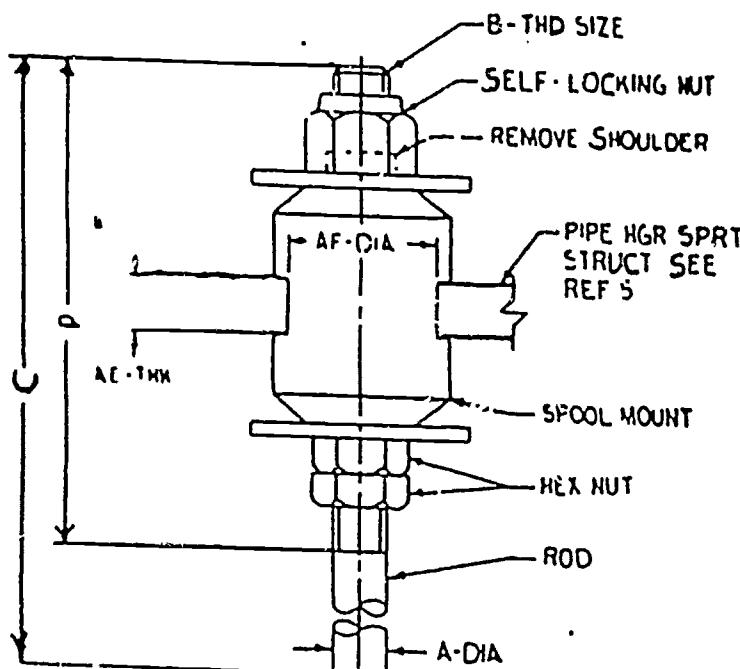
ITEM NO	ITEM NO	DESCRIPTION	MATERIAL	MATERIAL SPEC	REF Dwg	NM SHW OR STOCK NO	QUANTITIES ARE FOR ONE		NOTES (SEE NOTE)	REV
							REMARKS			
1	X8	TYPE 3 RUBBER BLOCK 3/4 INCH	STEEL RUBBER	XIL-S-6855 CL II	255154 SH 29, PG 2				SEE DETAIL SH 32	A
2	X8	50# UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 19 ASSY "97A"					A
3	X8	TYPE 4 HANGER SUPPORT (XOD)	STEEL	XIL-S-20188 IT U, GR X	256372 SH 10 ASSY 44100 (MOD)				SEE NCR DET SH 16 & 17	A
4	X8	50# UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 19 ASSY "97B"					A
5	X8	TYPE 1 HANGER SUPPORT	STEEL	QQ-S-141	256372 SH 110 ASSY "1450"					A
6	X8	TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "AE"					A
7	X8	TYPE 2 HANGER SUPPORT	STEEL	VARIOUS	256372 SH 131 ASSY "7HSO"				SEE NCR DET SH 14 & 20	A
8	X8	TYPE 3 HANGER SUPPORT	STEEL	XIL-S-20188 IT U, GR X	256372 SH 9 ASSY "3850"					A
9	X8	50# UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 19 ASSY "97A"					A
10	X8	TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "1450"					A
11	X8	TYPE 1 HANGER SUPPORT	STEEL		256372 SH 131 ASSY "7CSO"				SEE NCR DET SH 10, 18 & 19	A
12	X8	TYPE 2 HANGER SUPPORT	STEEL	QQ-S-761	256372 SH 9 ASSY "7ASO"					A
13	X8	TYPE 12 HANGER ASSY	VARIOUS		255454 SH 38 ASSY "EF"					A
14	X8	50# UNBONDED SPOOL MOUNT ASSY	VARIOUS		255454 SH 55 ASSY "FB"					A
15	X8	TYPE 3 HANGER SUPPORT	STEEL	QQ-S-761	256372 SH 10 ASSY "1450"				SEE NCR DET SH 25	A
16	X8	TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "EF"					A
17	X8	TYPE 4 HANGER SUPPORT (XOD)	STEEL	QQ-S-761	256372 SH 10 ASSY "1450 (MOD)"				SEE NCR DET SH 11	A
18	X8	TYPE 4 HANGER SUPPORT	STEEL	XIL-S-20188 IT U, GR X	256372 SH 10 ASSY "1450"				SEE NCR DET SH 13	A

216357

**NEWPORT NEWS SHIPBUILDING
AND DRY DOCK COMPANY**
MENTAL MUS. VACUUM DED.

RESILIENT MOUNTS FOR PIPE HANGERS ASSEMBLY AND DETAILS

~~THE STYLISH F/F PIPE HORN IS AS STYLISH AS IT IS FREE~~



DETAIL - A
UNBONDED SPOOL MOUNTS

1. Find assy. No. 97A, and read across.
 2. Size 50 lb. spool MT, P.C. no. 76 in L/M.
 3. Self LKG nut P.C. No. 3 in L/M.
 4. Hex Nut P.C. No. 12 in L/M.
 5. Rod says see sheet 28 proceed to that page

TABLE I. UNBONDED SPOOL MOUNTS DETAIL: A

NOTES	
1.	Pc No. 39 on rod table.
2.	All dimensions are located to the left of table.
3.	Example A = 3/8 Dia.
4.	All items found in list of material Pc No's 3, 12, 39, and 76.

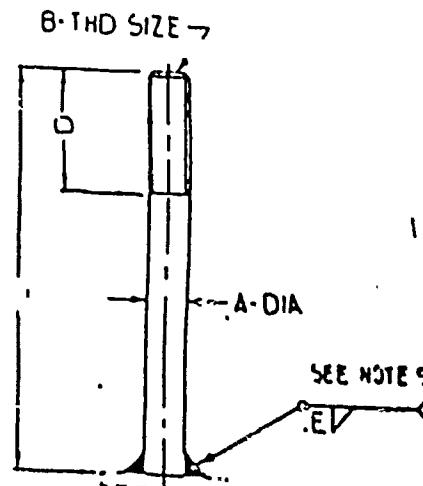
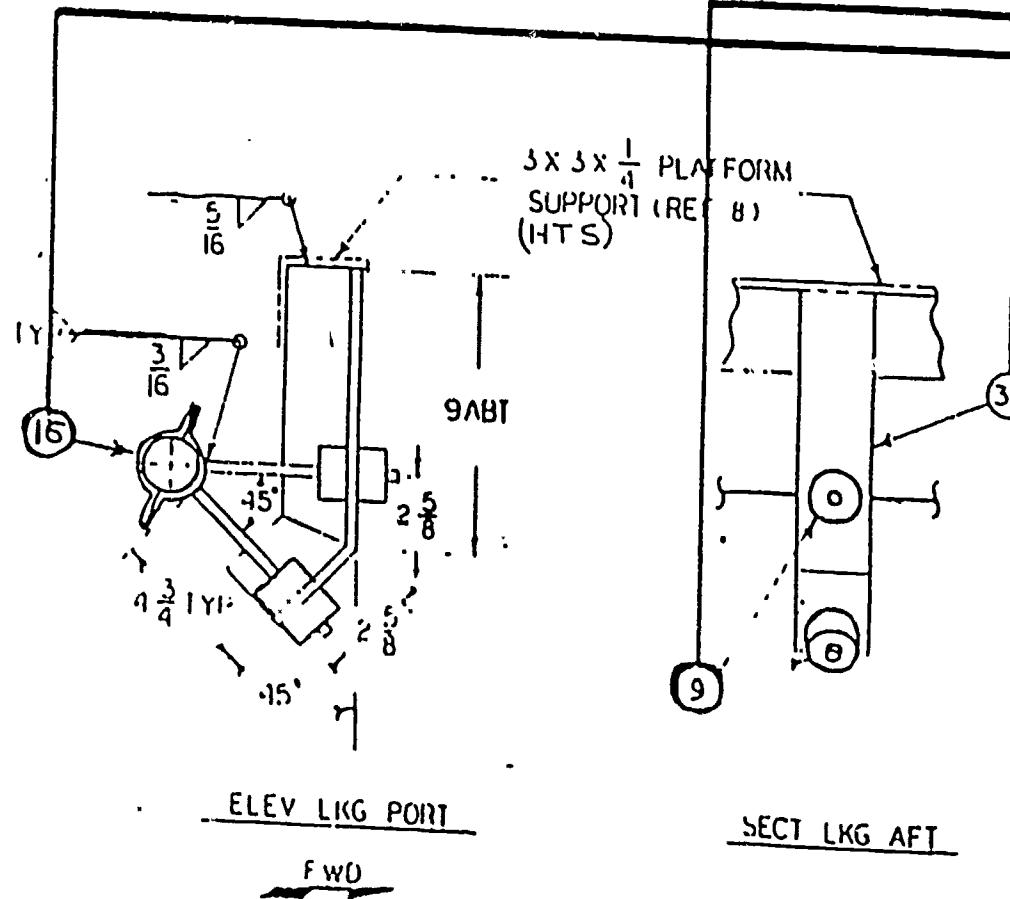


TABLE 6 RODS

PC NO	DIMENSIONS					NNPN/ SYM NO	REV
	1	2	3	4	5		
31	1/8	1/4-20 UNC-2B	11	0	3/16	1740311	H
31	3/16	3/16-18 UNC-2B		0	3/16	1740320	
31	3/8	3/8-16UNC-2B		12	3/16	1740312	
31	1/2	1/2-13 UNC-2B		11	1/1	1740573	
31	3/8	3/8-11 UNC-2B		12	3/16	1740313	
31	3/8	3/8-11 UNC-2B		12	3/16	1740321	
31	3/8	3/8-11 UNC-2B		12	3/16	1740314	
31	3/8	3/8-11 UNC-2B		12	3/16	1740322	
31	3/8	3/8-10 UNC-2B		12	3/16	1740315	
31	3/8	3/8-10 UNC-2B		17	3/16	1740323	
31	1	1-8 UNC-2B		17	3/16	1740316	
31	1-1/8	1-1/8-7 UNC-2B		17	3/16	1740324	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740317	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740325	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740318	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740326	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740319	
31	1-1/8	1-1/8-7 UNC-2B		17	1/1	1740327	

LIST OF MATERIAL

PC NO	QTY	DESCRIPTION	BASE	BASE SPEC	COPT SPEC OR DES HC	REMARKS	NNPN./SYM NO	REV
3	-	3/8 - 16 INC -3R	STEEL CD-PLD	-	-	-	-	
12	-	3/8 - 16 INC - 2B	STEEL ZINC PLD	-	-	-	-	
39	-	3/8 -	STEEL	-	-	-	-	
76	-	UNBONDED SPOOL 50# RESILIENT MOUNT	VARIOUS	-	SEE SH 28	-	-	

HANGERS H5

HANGER H5
CONSISTING OF:

ITEM NO	QTY	L/M SHAC	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6

NOTES

1. Remember your theory.
2. Item 16 consists of (clamp halves) (liner) and (nut and bolt)
3. For further information go to Ref. block in upper right hand corner of this page.
4. Go to sheet 6 find item 16.

PRIME COAT: ZINC CHROMATE
SEE NOTE 16

HULL NO.	DWG NO.	REV F
NAVSHIPS 516-45519	516-45519	REV F

- | NOTES | | | | | | | |
|--|--|--|--|--|--|--|--|
| 1. L/M gives you description and Ref. drawings. | | | | | | | |
| 2. The description of Item 16 is type 1 strap hanger. | | | | | | | |
| 3. For further Information go to Ref. block for plan numbers and assy. for detail of strap hanger. | | | | | | | |
| 4. Ref. Dwg. 255454 SH 14 Assy. E. | | | | | | | |
| 5. Proceed to proper drawing and assy. | | | | | | | |

ITEM NO	ASST NO	LIST OF MATERIAL					QUANTITIES ARE FOR ONE			NOTICE CONT (SEE NOTES)
		MIC	LYL	ZONE	DESCRIPTION	MATERIAL	MATERIAL SPEC	REF DVG	MM SYM OR STOCK NO	
1	MA				TYPE 6 RUBBER BLOCK 3/4 INCH	RUBBER	MIL-S-8855 CL XII	255454 SH 28, PG 2		
2	MA				100% UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 18 ASSY "96A"		SEE DETAIL SH 32
13	MA				TYPE 4 HANGER SUPPORT (MOD)	STEEL	MIL-S-20188 TT U, GR N	258372 SH 18 ASSY "A100" (MOD)		
1	MA				50% UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 19 ASSY "92B"		SEE HGR DET SH 16 & 17
3	MA				TYPE 1 HANGER SUPPORT	STEEL	QQ-S-741	258372 SH 18 ASSY "A50"		
4	MA				TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14, ASSY "E"		
7	MA				TYPE 2 HANGER SUPPORT	STEEL	VARIOUS	258372 SH 131 ASSY "7H50"		
1	MA				TYPE 3 HANGER SUPPORT	STEEL	MIL-S-20188 TT U, GR N	258372 SH 8 ASSY "3850"		SEE HGR DET SH 16 & 20
9	MA				50% UNBONDED SPOOL MOUNT ASSY	VARIOUS		216357 SH 18 ASSY "97A"		
10	MA				TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "F"		
11	MA				TYPE 2 HANGER SUPPORT	STEEL		258372 SH 131 ASSY "7C50"		
12	MA				TYPE 3 HANGER SUPPORT	STEEL	QQ-S-741	258372 SH 8 ASSY "3A50"		SEE HGR DET SH 18, 19 & 19
13	MA				TYPE 18 HANGER ASSY	VARIOUS		255454 SH 34, ASSY "A1"		
14	MA				50% UNBONDED SPOOL MOUNT ASSY	VARIOUS		255454 SH 55 ASSY "F8"		
15	MA				TYPE 3 HANGER SUPPORT	STEEL	QQ-S-741	258372 SH 10 ASSY "4A50"		
16	MA				TYPE 1 STRAP HANGER	VARIOUS		255454 SH 14 ASSY "F"		SEE HGR DET SH 25
17	MA				TYPE 4 HANGER SUPPORT (MOD)	STEEL	QQ-S-741	258372 SH 10 ASSY "A50" (MOD)		
18	MA				TYPE 4 HANGER SUPPORT	STEEL	MIL-S-20188 TT U, GR N	258372 SH 10 ASSY "A50"		SEE HGR DET SH 11
										SEE HGR DET SH 13

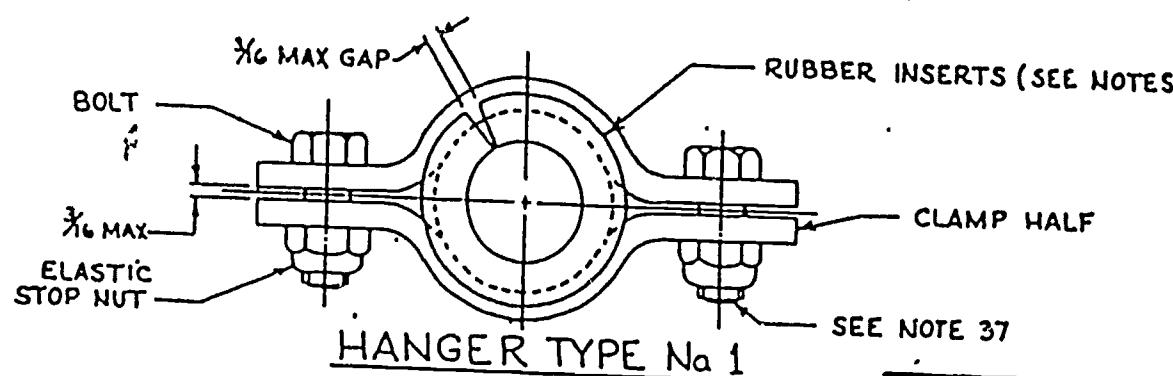
255454

NOTES									
1.	Find assy. E.								
2.	Assy. E IPS size is 1".								
3.	Clamp half (PC No. 155) see sheet 15.								
4.	Rubber insert P.C. No 455 (liner) see sheet 16.								
5.	Bolt P.C. No 52 see sheet 10.								
6.	nut P.C. No. 29 see sheet 9.								

NOTE: Remember the P.C. No. before going to another sheet.

ASSEMBLIES FOR STRAP HANGERS												
NOMINAL PIPE SIZE		TEMPERATURES 250°F AND LESS										
		STEEL					STEEL (ZINC COATED)					
		ASSY	NNPN FOR ASSY	PC NO.	ASSY	NNPN FOR ASSY	PC NO.	ASSY	NNPN FOR ASSY	PC NO.		
				CLAMP HALF SWISS RUBBER INSERT BOLT NUT SWISS			CLAMP HALF SWISS RUBBER INSERT BOLT NUT SWISS			CLAMP HALF SWISS RUBBER INSERT BOLT NUT SWISS		
				2 RECD 1 RECD	2 RECD 1 RECD		2 RECD 1 RECD			2 RECD 1 RECD		
1/4	A	2403243	151	451	51	28	AA	2403257	201	451	74	33
5/16	B	244	152	452	51	28	AB	2409186	202	452	74	33
3/8	C	245	153	453	52	29	AC	2403258	203	453	75	34
7/16	D	246	154	454			AD	2409187	204	454		
1	E	247	155	455			AE	2403259	205	455		
1 1/16	F	248	156	456			AF	2409188	206	456		
1 1/8	G	249	157	457	53	0	AG	2403260	207	457	76	0
1 1/4	H	250	158	458	54	1	AH	261	208	458	77	
2 1/16	J	251	159	403	55	30	AJ	262	209	403	78	35
3	K	252	160				AK	263	210			
3 1/16	L	253	161				AL	2409189	211			
4	M	254	162				AM	2403264	212			
5	N	255	163				AN	265	213			
6	P	2403330	164		56	31	AP	266	214		79	36
0	R	2403256	165		56	31	AR	267	215		79	36

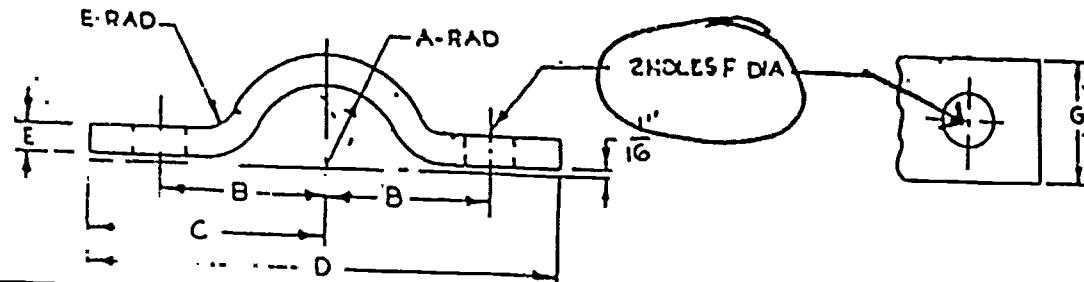
PC NO 52 & 75 MAY BE SUBSTITUTED FOR PC NO 53 & 76, RESPECTIVELY.



SHEET 14

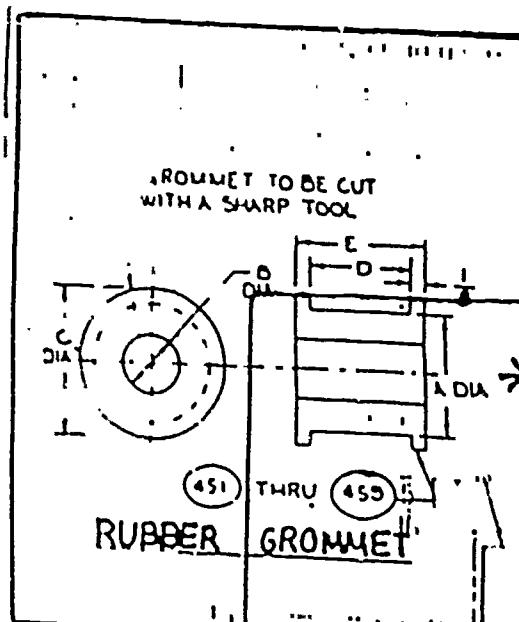
CLAMP HALF

NUM PIPE SIZE	MATERIAL												MIN ORD QTY	DIMENSIONS						
	STEEL				STEEL/ZINC COATED				CRES					A	B	C	D	E	F	G
PC NO	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO	PC NO.	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO	PC NO.	MATL SPEC	RAW MATL SOURCE	NN SYMBOL OR STOCK NO									
1 151	QQ S-678	97-20-250		201	QQ-S-678	97-20-250		301	QQ-S-7000	97-34-084			1	29	13	7	3	1	2	6
2 152				202				302					1	15	13	13	3	1	2	6
3 153		-251		203		-251		303	QQ-S-7000	97-34-596			1	15	13	13	3	1	2	6
4 154				204				304					3	4	18	2	4	3	2	1
5 155				205				305					3	29	13	2	4	1	2	1
6 156	QQ S 741	31-301		206	QQ-S-741	-31-301		306					6	29	15	24	4	3	7	1
7 157				207				307					6	13	13	21	6	1	2	1
8 158				208				308					7	13	2	21	3	1	2	1
9 159		-304		209		-304		309					8	13	21	28	3	1	2	1
10 160				210				310					9	13	23	38	0	1	2	1
11 161				211				311					10	2	23	31	7	1	2	1
12 162				212				312					10	2	3	31	7	1	2	1
13 163				213				313					11	2	3	41	8	1	2	1
14 164		-305		214		-305		314					13	33	4	41	9	1	2	1
15 165				215				315					16	32	41	41	11	1	2	1
													19	42	5	6	13	2	2	1



NOTES

1. PC No. 155 1" IPS
2. Read to dimensions table
3. Dimensions are lettered to go with diagram below.
4. Example 2 holes F dia. F = 7/16
5. Go to Sheet 16 find item 455



RUBBER GROMMET INSERTS 100°F MAX.

PC NO.	PIPE SIZE	MATERIAL	MATERIAL SPEC	RAW MTL SOURCE	NN SYM OR STOCK NO.	DIMENSIONS					REMARKS
						A	B	C	D	E	
451	1/4	RUBBER SYNTHETIC	MIL-S-6055 CL II COLOR		97-79-070	23/32	1	11/16	5/16	13/16	401 MAY BE SUBSTITUTED 100°F & LESS
452	3/8				97-79-071	13/16	11/16	13/16	13/16	13/16	402 MAY BE SUBSTITUTED 100°F & LESS
453	1/2				97-79-072	11/8	13/32	13/16	13/16	13/16	
454	5/8				97-79-073	9/16	11/16	13/16	13/16	13/16	
455	1				97-79-074	13/16	11/16	13/16	13/16	13/16	
456	1 1/2				97-79-080	2 1/2	11/16	13/16	13/16	13/16	
457	1 1/2				97-79-076	7/16	13/32	2 1/16	2 1/16	2 1/16	
458	2				97-79-077	2 3/8	7/8	3/8	3/8	3/8	
459	1/2 OD				97-79-078	1/2	13/16	5/8	5/8	5/8	
460	1				97-79-081	13/16	13/16	13/16	13/16	13/16	

DRAW NO. 255454 REV. 16

NOTES (1)

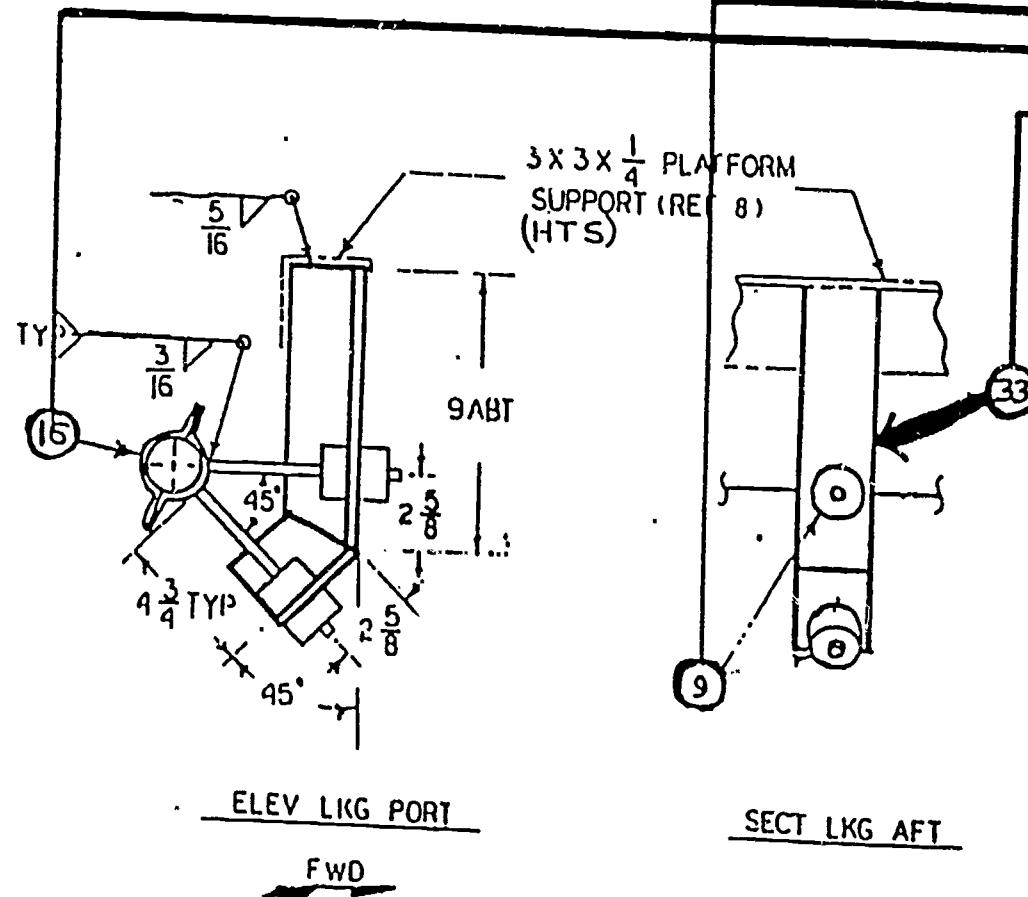
- PC. No. 455 is a 1" grommet.
- Dimensions are lettered by size.
- Example: B dia. = 1 5/16".
- PC. No. 29 sheet 9.
- PC. No. 52 sheet 10.

SHEET 9 LIST OF MATERIAL

PC NO.	QUANTITY OF MTL	DESCRIPTION	MATERIAL	MTL SPEC	RAW MTL SOURCE	NN SYMBOL OR STOCK NO.	REMARKS
27	LG AS SHOWN	MULTIPLE STRAP HANGER	STEEL - ZINC PLATED	OO-S-644	97-20-251	—	FOR LG TYPE SEE
28	2	1	1/2	OO-S-721	97-31-301	—	
29	1	1	1/2	—	97-31-304	—	
27	—	HEX MT SELF LOCKING	STEEL A CO PLD	MIL-N-25027	—	97-64-224	MS 170290 CLASS 30
28	—	1/8 UNL-2A	—	—	—	97-64-225	SEE NOTE 1 IT MAY BE INSTITUT
29	—	1/8 UNC-2A	—	—	—	97-64-226	136

SHEET 10 LIST OF MATERIAL

PC NO.	QUANTITY OF MTL	DESCRIPTION	MATERIAL	MTL SPEC	RAW MTL SOURCE	NN SYMBOL OR STOCK NO.	REMARKS
47	LG 27	HEX HEAD BOLT 20 UNC 2A	STEEL ZINC PLD	MIL-B-BSTA GR 2 TY II	—	97-60-410	
48	2	1	—	—	SY 97-LC-411	—	CUT FRLM LG. 3"
49	1	1	—	—	—	97-60-435	
50	1/2	1	—	—	—	97-60-436	
51	1	1	—	—	—	97-60-415	
52	1/2	1	—	—	—	97-60-427	

HANGERS H5

HANGER H5
CONSISTING OF:

ITEM NO	QTY	L/M S/AO	REMARKS
9	2	6	
16	1	6	
33	1	7	SEE NOTE 6

NOTES

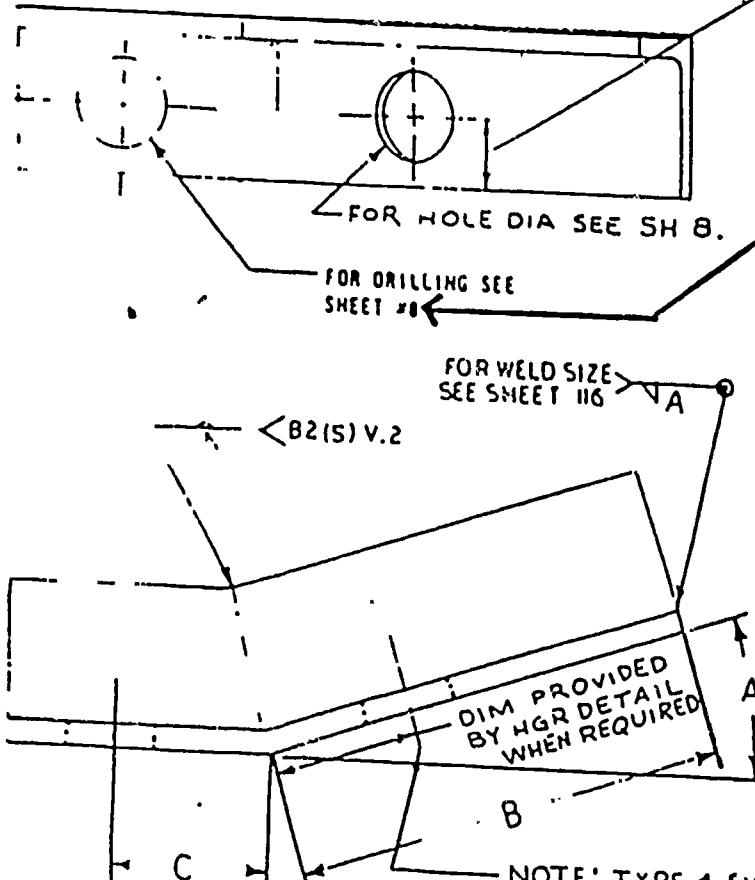
1. Item 33 is a support.
2. For details of support go to SH 7 in list of material. Look up item 33.
3. Item 33 says look in plan 256 1/2 assy. 4A50 on sheet 10 for details.
4. Proceed to proper plan and sheet and assy.

PRIME COAT: ZINC CHROMATE
SEE NOTE 1G

HULL NO. _____	DWG. NO. 355-202 REV F
NAVSHIPS 516-4554955 SHEET 2 of	

	ASST NO	LIST OF MATERIAL				QUANTITIES ARE FOR ONE				
ITEM NO	WIC LVL	ZONE	DESCRIPTION	MATERIAL	MATERIAL SPEC	REF BKG	MM STM OR STOCK NO.	REMARKS	NOISE CONC (SEE NOTE)	REV
33	NA		TYPE 4 HANGER SUPPORT (MOD)	STEEL	00-S-141	256372 SH 10 ASSY 450 (MOD)		SEE HGR DET SH 12		1

DIMENSION PROVIDED BY
HGR DET WHEN REQUIRED



NOTE: TYPE 4 SUPPORT STRUCTURE MAY BE
MODIFIED BY DRILLING HOLE WHEN
REQUIRED BY HANGER DETAIL.

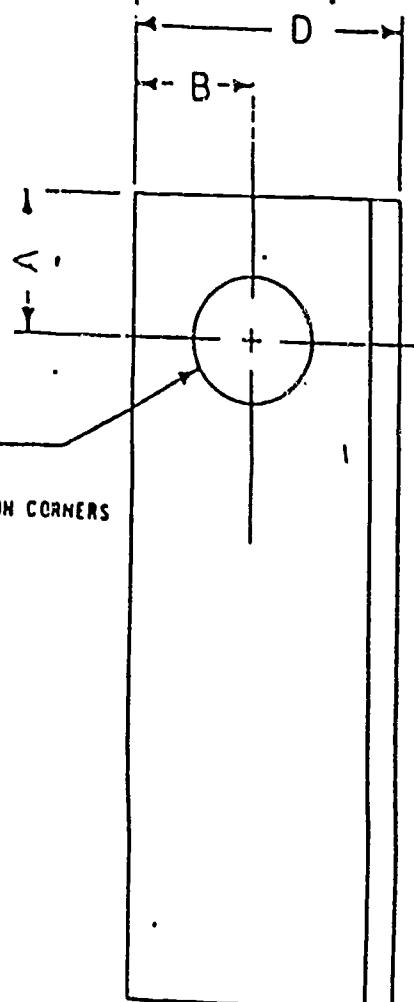
TYPE 4 SUPPORT

ANGLE TOTAL LG	ASSY NO.	ANGLE BAR		A ANGLE	B DIM	C DIM	REMARKS
		SIZE	PC NO. SH 5				
B+C+3/4	4A15	2X2X1/4	5				THE SUM OF E + C + 3/4 NOT TO EXCEED 14
B+C+3/4	4B15	2X2X1/4	6				THE SUM OF E + C + 3/4 NOT TO EXCEED 14
B+C+3/4	4C15	3X3X1/4	7				THE SUM OF E + C + 3/4 NOT TO EXCEED 14
B+C+1	4A50	2 1/2 X 2 1/2 X 3/8	8	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	THE SUM OF E + C + 1 NOT TO EXCEED 14
B+C+1	4B50	3X3X3/8	9	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	THE SUM OF E + C + 1 NOT TO EXCEED 14
B+C+1	4C50	3 1/2 X 3 1/2 X 3/8	10	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	THE SUM OF E + C + 1 NOT TO EXCEED 14
B+C+1 1/4	4A100	3 1/2 X 3 1/2 X 1/2	12	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	DETERMINED BY ARR PLAN	THE SUM OF E + C + 1 1/4 NOT TO EXCEED 14
B+C+1 1/4	4B100	4X4X1 1/2	13	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	THE SUM OF E + C + 1 1/4 NOT TO EXCEED 14
B+C+1 1/2	4A200	4X4X 5/8	14	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	THE SUM OF E + C + 1 1/2 NOT TO EXCEED 14
B+C+1 1/2	4B200	5X5X 5/8	16	TO BE DETERMINED	TO BE DETERMINED	TO BE DETERMINED	THE SUM OF E + C + 1 1/2 NOT TO EXCEED 14

NOTES

1. Go to Sheet 8 for drilling instructions.

NOTE: Always read information around the diagrams given.



SUPPORT DRILLING

MOUNT SIZE	PC NO. SH 5	SUPPORT	DIMENSIONS		
			A-DIM	B-DIM	C-DIM
15#	5	2 x 2 x 1/4	3/4	7/8	1.8
15#	6	2 1/2 x 2 1/2 x 1/4	3/4	1 1/2	2 1/2
15#	7	3 x 3 x 1/4	3/4	1 3/8	1 3/8
50#	8	2 1/2 x 2 1/2 x 3/8	1	1 1/8	1 1/4
50#	9	3 x 3 x 3/8	1	1 5/16	1 1/4
50#	10	3 1/2 x 3 1/2 x 3/8	1	1 9/16	1 1/4
100#	11	3 x 3 x 1/2	1 1/4	1 1/4	1 1/4
100#	12	3 1/2 x 3 1/2 x 1/2	1 1/4	1 1/2	1 1/4
100#	13	4 x 4 x 1/2	1 1/4	3/4	1 1/4
200#	14	4 x 4 x 5/8	1 1/2	1 1/16	1 5/8
200#	15	5 x 5 x 5/8	1 1/2	1 1/16	1 5/8
200#	16	5 x 5 x 5/8	1 1/2	2 3/16	1 5/8

NOTES

1. Always check your item No. in list of material.
2. P.C. No. 8 Sheet 5
3. Proceed to proper sheet and P.C. No.

SH 5 PC NO 8

8 ANGLE BAR 2 1/2 x 2 1/2 x 3/8 STL

HULL NO.
REV: B

PW6 256372
SH 8

STUDENT MATERIAL LIST

B-28 Pipehanger Blueprint Reading

Lesson 2

Materials Req.

Dwgs. 256372 R/F, 216357 R/M, 255454 R/L, 256373 R/F, 2285-213 R/F

Student Material List Answer Sheet

Question 1

**Using Cross-Referencing System identify all parts of Hanger H-1.
List answers in order on answer sheet.**

Question 2

**Using Cross-Referencing System identify all parts of Hanger H-19.
List answers in order on answer sheet.**

B-28 Pipehanger Blueprint Reading

Lesson 3 Reading Configuration Drawings

Dwg #6553-591 R/Z

1. What type and size weld is required to attach pc.80 of hanger CF-H-504 to the ship's structure?

ANS: 9/16" fillet weld, far side - single bevel fillet near side TZV.1 backgrind required.

2. How far above the main axis would hanger CF-H-252 be located?

ANS: 6' 3" above the main axis

3. What is the piece number and what type of piping is being supported by hanger CF-H-173?

ANS: F-18D, Flex-hose assy

4. How far off vertical must the rod for hanger CF-H-513 be rolled?

ANS: 30°

5. What is the minimum lug length for hanger CF-H-549?

ANS: 4"

6. What type and size weld is required to attach pc.100 to pc.62 on hanger CF-H-177?

ANS: 3/8" fillet all around

7. How far aft of fr. 96 is hanger CF-H-205 located?

ANS: 15" aft fr. 96

8. What pipes are being supported by hanger CF-H-205?

ANS: P57-3, P55-3, and P219-1

B-28 Pipehanger Blueprint Reading

Lesson 3 Reading Configuration Drawings Dwg #6553-591 R/Z

9. What is the angle between the rods on hanger CF-H-616?

ANS: 60° ($40^{\circ} + 20^{\circ}$)

10. What is the length of item 97 on hanger CF-H-548?

ANS: 10"

11. What type and size weld would be required to attach item 38 to item 126 on hanger CF-H-205?

ANS: 3/8" fillet all around

12. How far off the vertical centerline would P58-3 on CF-H-206 be located?

ANS: $54\frac{1}{2}$ "

13. Hanger CF-H-260 supports what pipe?

ANS: P227-5

14. What is the tolerance for angles given on this hanger plan?

ANS: $\pm 5^{\circ}$

15. What is the dimension given for the mount from the clamp on the aft leg of hanger CF-H-153?

ANS: $6\frac{1}{2}$ "

16. On hanger CF-H-411 what type and size weld is required to attach pc 15-2 to pc 15-1?

ANS: 5/16" weld near side only, fillet

17. How far below the main axis would hanger CF-H-295 be located?

ANS: 1" BMA

B-28 Pipehanger Blueprint Reading

Lesson 3 Reading Configuration Drawings Dwg #6553-591 R/2

18. What is the pipe number and size of the pipe supported by hanger CF-H-569?

ANS: P13-3, 1 $\frac{1}{2}$ " I.P.S.

19. How many degrees will the clamp half be rolled off vertical on hanger CF-H-663?

ANS: 70°

20. What is the overhang allowed for pc 77 to the Bilge Collecting Sump Structure on hanger CF-H-165?

ANS: 1"

21. What type of weld inspection is required to sell the ship's attachment weld on hanger CF-H-191?

ANS: MT required

22. How far below the main axis would hanger CF-H-260 be located?

ANS: 8' 9"

23. Hanger CF-H-354 supports what type of piping?

ANS: Capillary tubing

24. What is the angle required for item 32 on hanger CF-H-174?

ANS: 30°

25. What is the length of item 85 on the inboard leg of CF-H-167?

ANS: 8 $\frac{1}{2}$ "

Lesson 4 (cont.)

11. H-154
Ans.

12. H-35
Ans.

13. H-3
Ans.

14. H-17
Ans.

15. H-186
Ans.

Lesson No. 4

Materials Required:

Dwgs. 2744-51 R/J, 2744-33 R/H

Instructions:

Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axus or ABL)

1. H-106

Ans. 9-3/4" fwd. Fr. 115, 27 $\frac{1}{2}$ " Port, 59" BMA

2. H-85

Ans. 64" port, 14" Aft Fr. 115, 46 $\frac{1}{2}$ " AMA

3. H-139

Ans. 3" fwd. Fr. 114, 6' 9" Stbd., 11' 6" AMA

4. H-183

Ans. 25 $\frac{1}{2}$ " Port, 8 $\frac{1}{2}$ " Aft Fr. 106, 8' 11 $\frac{1}{2}$ " BMA

5. H-5

Ans. 6' 10" Port, 9" Aft Fr. 99, 6' 10 $\frac{1}{2}$ " BMA

6. H-111

Ans. 3" Aft Fr. 114, 22" Stbd, 60" BMA

7. H-7

Ans. 12' 5" Port, 7' 0 $\frac{1}{2}$ " BMA, 17" Aft Fr. 99

8. H-30

Ans. 56" Port, 13 $\frac{1}{2}$ " Fwd Fr. 112, 62-3/4" BMA

9. H-149

Ans. 8' 3" AMA, 13' 1 $\frac{1}{2}$ " Stbd, 11" Fwd. Fr. 103

10. H-88

Ans. C Fr. 117, 10' 7" Port, 44" AMA

Lesson 4 (cont.)

11. H-154
Ans. 7"Port, 15'6"AMA, 6"Fwd Fr.101

12. H-33
Ans. 26 $\frac{1}{2}$ "AMA, 4"Fwd Fr.112, 13'9"Port

13. H-3
Ans. 11 $\frac{1}{2}$ "Aft Fr.99, 28"Port, 8'10"BMA

14. H-17
Ans. 9"Fwd Fr.107, 22"Port, 13'13 $\frac{1}{2}$ "BMA

15. H-186
Ans. 5"Stbd, 14'1-3/4"AMA, 13-3/4"Fwd Fr.109

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:

Dwgs. 2740-377 R/K

Instructions:

Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-3
Ans.
2. H-6
Ans.
3. H-40 (No Height Dim)
Ans.
4. H-18
Ans.
5. H-32
Ans.
6. H-29
Ans.
7. H-13
Ans.
8. H-49
Ans.
9. H-4
Ans.
10. H-30
Ans.
11. H-39
Ans.
12. H-14
Ans.
13. H-5 (No Height Dim)
Ans.
14. H-20
Ans.
15. H-25

B-28

PIPEHANGER BLUEPRINT READING

Lesson No. 5

Materials Required:

Dwgs. 2740-377 R/K

Instructions:

Give all locations for the following hangers.
(Port/Stbd. of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-3
Ans. 12'8-1/8"Port, 8 $\frac{1}{2}$ "Fwd. Fr. 53, 12'11-3/4"ABL
2. H-6
Ans. 16"Fwd Fr. 59, 42"Port, 79"ABL
3. H-40 (No Height Dim)
Ans. 6'6"Port, 10-3/4"Aft Fr.51
4. H-18
Ans. 17"Fwd Fr.62, 7'1"Stbd, 15'2"ABL
5. H-32
Ans. 17"Aft Fr.57, 11'8"Stbd, 15'0-1/4"ABL
6. H-29
Ans. 41-3/4"Aft Fr.51, 11'10"Stbd., 15'0-1/4"ABL
7. H-13
Ans. 22"Aft Fr. 59, 10'2"Stbd, 83"ABL
8. H-49
Ans. 22'1"ABL, 8'9"Stbd, 4"Fwd Fr.62
9. H-4
Ans. 3 $\frac{1}{2}$ "Fwd Fr.52, 12'5-1/8"Port, 9'8 $\frac{1}{2}$ "ABL
10. H-30
Ans. 6"Aft Fr.54, 11'10"Stbd, 15' $\frac{1}{2}$ "ABL
11. H-39
Ans. 10-3/4"Aft Fr.51, 44 $\frac{1}{2}$ "Port, 31'10"ABL
12. H-14
Ans. 22"Fwd.Fr.62, 10'2"Stbd, 7'5 $\frac{1}{2}$ "ABL
13. H-5 (No Height Dim)
Ans. 10 $\frac{1}{2}$ "Fwd Fr.58, 55-5/16"Port
14. H-20
Ans. 9"Fwd Fr.59, 10'9-3/4"Stbd, 8'2"ABL
15. H-25
Ans. 18"Aft Fr.56, 10'3-3/4"Stbd, 8'2"ABL

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers:
(Port/Stbd, of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-13
Ans.
2. H-6
Ans.
3. H-19
Ans.
4. H-66
Ans.
5. H-26
Ans.
6. H-27
Ans.
7. H-33
Ans.
8. H-25
Ans.
9. H-28
Ans.
10. H-3
Ans.
11. H-41
Ans.
12. H-2
Ans.
13. H-10
Ans.
14. H-44
Ans.
15. H-53
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson No. 6

Materials Required:

Dwgs. 2285-237 R/C, 2285-238 R/C

Instructions:

Give all locations for the following hangers:
(Port/Stbd, of Centerline, Fwd./Aft of Frame
Abv./Blw Main Axis or ABL)

1. H-13 Ans. 10"Aft Fr.91, 11'6"BMA 9'8"Port
2. H-6 Ans. 6"Aft Fr.88, 13'7"BMA, 21 $\frac{1}{2}$ "Stbd
3. H-19 Ans. 6"Aft Fr.108, 14'10"BMA, 18 $\frac{1}{2}$ "Stbd
4. H-66 Ans. 6"Aft Fr.108, 11'6"BMA, 8'0-3/4"Port
5. H-26 Ans. 6"Aft Fr.95, 15'BMA, 17"Port
6. H-27 Ans. 6" Aft Fr.97, 17"Port, 15"BMA
7. H-33 Ans. 9"Aft Fr.99, 13'2-3/4"BMA, 7'5"Port
8. H-25 Ans. 6"Fwd Fr.95, 18 $\frac{1}{2}$ "Stbd, 14'10"BMA
9. H-28 Ans. 9"Fwd Fr.97, 14'3"BMA, 18 $\frac{1}{2}$ "Stbd
10. H-3 Ans. 6"Aft Fr.88, 69 $\frac{1}{2}$ "Stbd, 13'7"BMA
11. H-41 Ans. 10"Fwd Fr.102, 7'5"Port, 12'8"BMA
12. H-2 Ans. 47"STBD, 18 $\frac{1}{2}$ "AFT Fr.87, 13'7"BMA
13. H-10 Ans. 7 $\frac{1}{2}$ "AFT Fr.87, 8'5-3/4"BMA, 10'1"PORT
14. H-44 Ans. 6 Fr.105, 6'7-3/4"PORT, 11'6"BMA
15. H-53 Ans. 6 Fr.111, II of ship 13'3 $\frac{1}{2}$ "BMA

B-28 PIPEHANGER BLUEPRINT READING

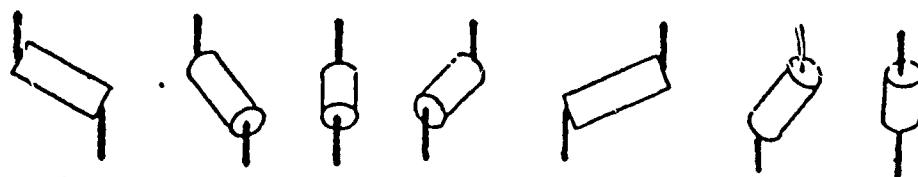
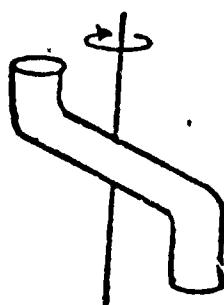
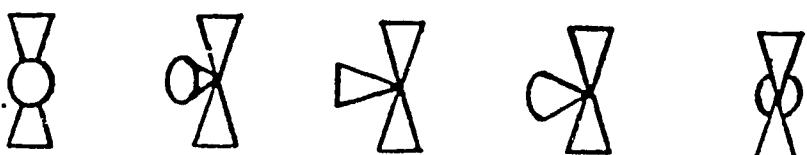
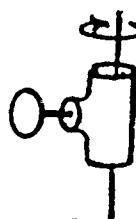
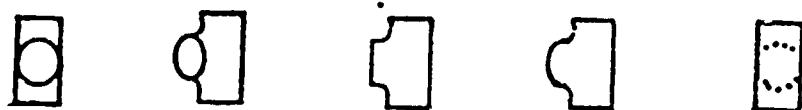
LESSON NUMBER #7

Materials Required:

Handout Pipefitter Symbols for Fittings
Handout Pipefitter Blueprint Reference
Dwgs. 2285-237 R/C, 2285-238 R/C

- 1: Using handouts and blueprints provided, discuss use of piping symbols and references.

HANDOUT: PIPING SYMBOLS FOR FITTINGS



TRUE SCALE - means the scale shown the face of the blueprint is 1/2 of the actual scale used.

NON-DETAIL - means that the pipefitter will have to make a template from the plan and the ship.

DATUM LINE-- means it is a reference line; e. g., at a point marked 0' 0", from that point or line.

NEAR & FAR - near would be the pipe on a plan that is the closest to you and far is just the opposite.

DIA. FORM - is to what diameter the pipe will be bent to.

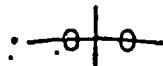
TR + IPS - is the formula used to compute the diameter form of a pipe bent from the detail plan.

--- - three dashes on a detail plan at the end of the pipe indicates, allowance of three inches at the end of the pipe for tolerances, also at the start of the pipe

--> -{- - on a plan indicates a bend in the pipe and which direction it is bent in.



- symbol indicates that there is a hidden bend in the pipe on the plan.



- indicates two holes up for alignment of a flange.



- indicates one hole up for alignment on a flange.



- indicates a pipe bend on a plan that is bending directly towards you from the plan.



- indicates a pipe bend on a plan that is bending directly away from on the plan.

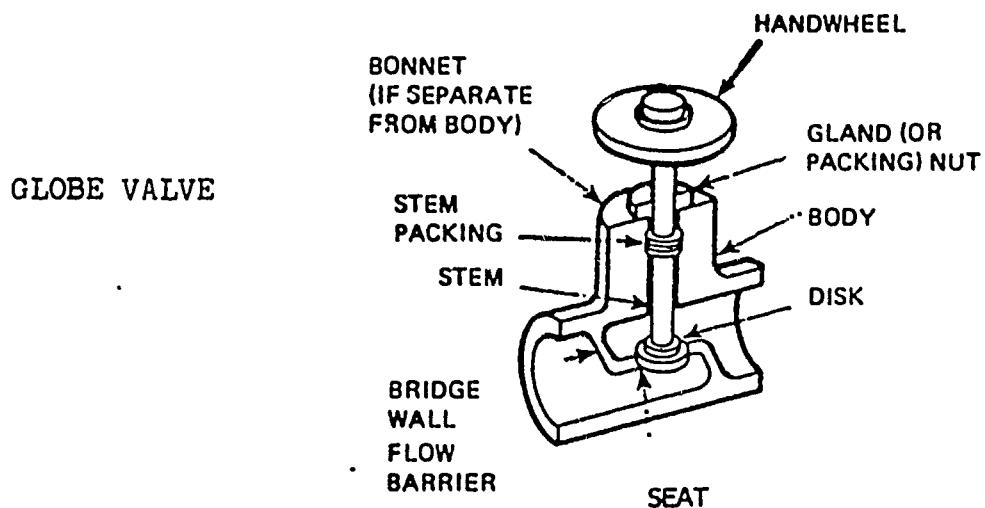


- indicates direction of flow of fluid on a plan.

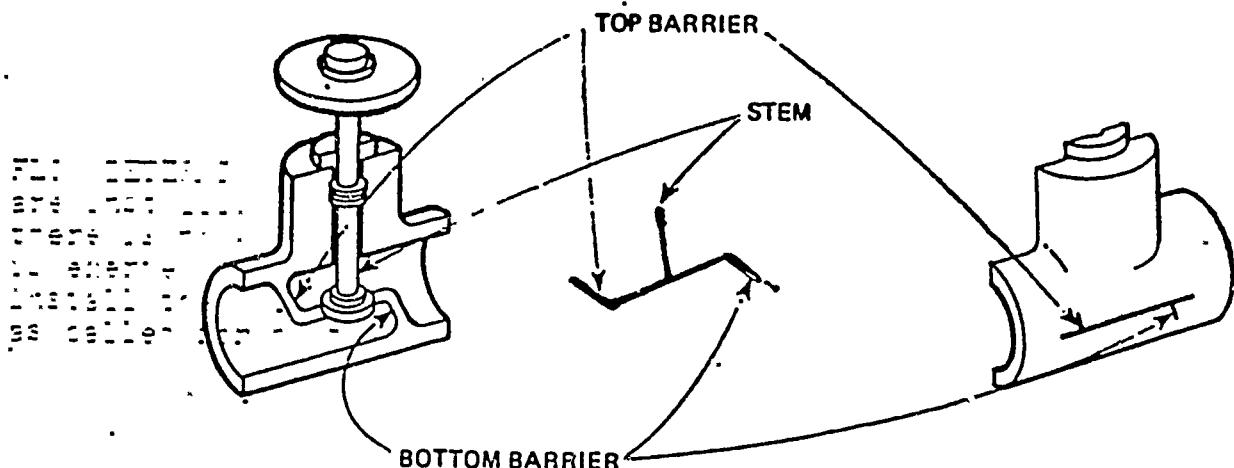


- indicates flow may go in either direction.

This symbol is commonly called a BRIDGE MARK and is found on the blueprint and the Globe Valve body. It is this symbol that is used for orientation of the Globe Valve for installation.

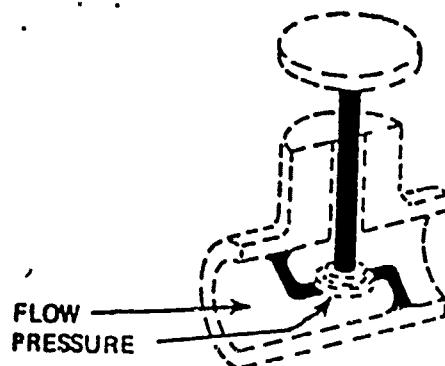


The BRIDGE MARK is nothing more than the internal construction of the Globe Valve - it consists of the Flow Barrier and the Stem.

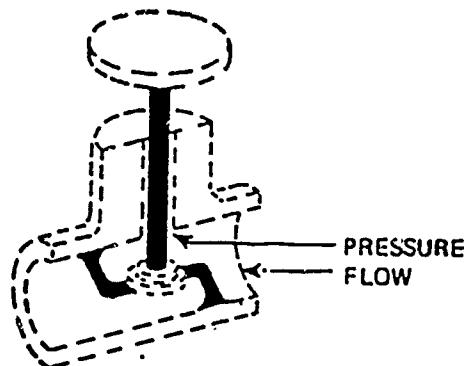


Because the BRIDGE MARK represents the internal construction of the valve, it can be used to orient the valve for installation.

TYPICAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the seat of the valve.

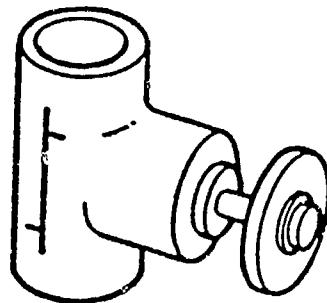
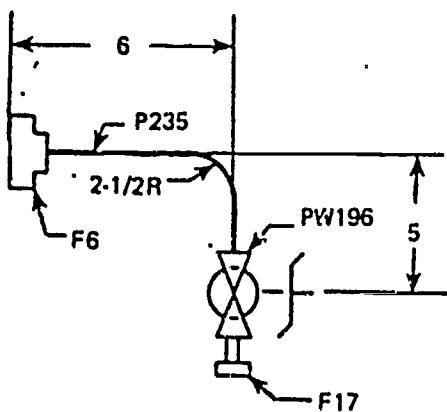


SPECIAL VALVE INSTALLATION is designed so that the fluid flow and pressure act against the packing rather than the seat.



FLOW DETERMINATION - There is no way of knowing if the valve you are installing is a Typical or a Special valve installation, therefore there is no way to know which way the fluid flows or where the pressure is exerted. The only way to ensure proper valve installation is to install the valve with its BRIDGE MARK oriented in the same direction as called for by the blueprint.

The Globe Valve must be installed with its BRIDGE MARK oriented in the same direction as the BRIDGE MARK on the blueprint - REGARDLESS of flow direction or pressure.



NOTE - BRIDGE MARKS are not used to orient the valve handle during installation - the valve symbol is used for this purpose.



If the BRIDGE MARK is missing or incomplete on the:

Valve - stop work and see your supervisor. A BRIDGE MARK MUST be placed on the valve before installation - Lack of a BRIDGE MARK is cause for rejection.

Plan - stop work and see your supervisor. Do not interpret it yourself.

B-28 PIPEHANGER BLUEPRINT READING

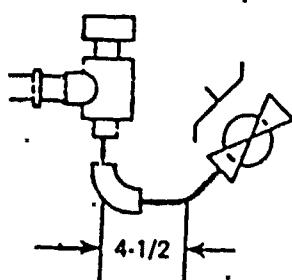
Lesson Number 8

Materials: Drawing Numbers- 2300-543 R/N, 2300-544 R/P

1. What type and size fitting is F-23 ?
Ans.
2. How many F-2 fittings are required on this drawing ?
Ans.
3. What service does HP-368 perform ?
Ans.
4. What plan would be used to locate the foundation to which HP-362 is attached ?
Ans.
5. How many $\frac{1}{2}$ " flanges are used on these drawings ?
Ans.
6. What pipes are used to service the Port Torpedo Hoist Cylinder ?
Ans.
7. What pipes are used to service F-26 ?
Ans.
8. In what revision was fitting F-8 added ?
Ans.
9. F-26 is shown in zone 4 B + C on drawing 2300-544 plan view, what section view also shows F-26 ?
Ans.
10. In what revision was H-49 added ?
Ans.

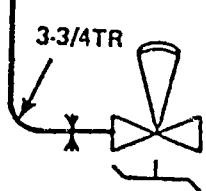
Compare the valve drawing with the four piping details and indicate which end of the valve is fitted to the pipe - End A or End B.

1.

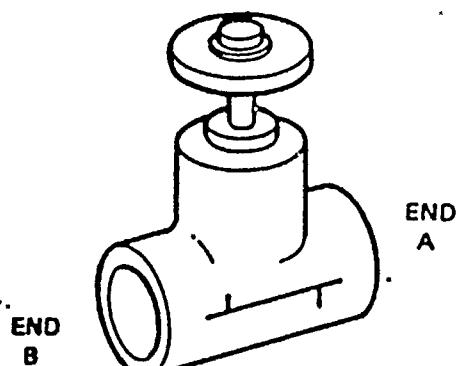


1. _____

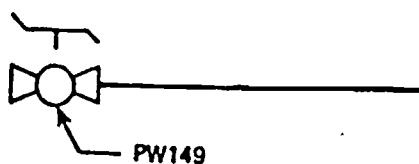
2.



2. _____

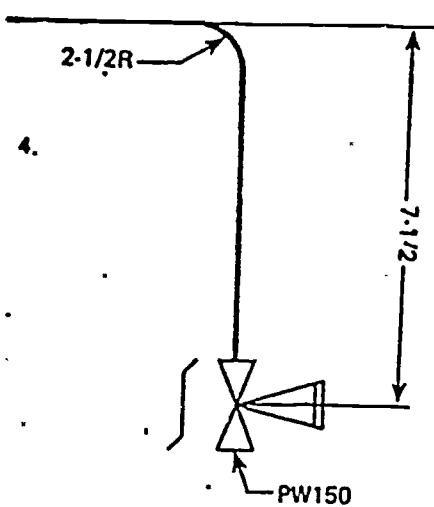


3.



3. _____

4.



4. _____

Lesson Number 8 cont.

11. In what revisions were the locations for H-35 + H-36 changed ?
Ans.
12. On what plan would you find the hanger details ?
Ans.
13. What does the symbol G_2 next to H-38 in the hanger table signify ?
Ans.
14. Where would you find a complete list of notes for drawing 2300-543 ?
Ans.
15. What valve connects to shuttle cylinder No. 2 ?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?
Ans.
2. Does P2538T- $\frac{1}{2}$ " service HS-41 or HS-42 ?
Ans.
3. F-6 is a reducing tee, what pipe or pipes does it service ?
Ans.
4. In what direction is the flow for HS-64 ? (Port or Stdb)
Ans.
5. Why was hanger H-17 revised ?
Ans.
6. In the valve list, HS-64 has a + symbol to the left, why ?
Ans.
7. To what block valve is FL-2 attached ?
Ans.
8. What is the pipe length required for P-2877 ?
Ans.
9. What pipe or pipes are supported by hanger H-18 ?
Ans.
10. In what direction is the flow of HS-38 ? (Up or Down)
Ans.
11. HS-37 has two lines connected to the top, what are the pipe numbers ?
Ans.

Lesson 9 Cont.

12. How far off the baseline is the bottom of HS-36 located ?

Ans.

13. In section view 14A what is the distance between centers
of pipes P2539U- $\frac{1}{2}$ " and P2538T- $\frac{1}{2}$ " ?

Ans.

14. What type of material is used for HS-35 ?

Ans.

15. How many F-4 fittings are used on this drawing and to
what pipes are they attached ?

Ans.

B-28 PIPEHANGER BLUEPRINT READING

-Lesson Number 9

Materials: Drawing 2300-547x1

1. Is valve HS-33 when installed, locked open or shut ?

Ans. LOCKED SHUT

2. Does P2538T- $\frac{1}{2}$ " service HS-41 or HS-42 ?

Ans. HS-42

3. F-6 is a reducing tee, what pipe or pipes does it service ?

Ans. P2598-3/8", P2832- $\frac{1}{2}$ ", and HS-33

4. In what direction is the flow for HS-64 ? (Port or Stdb)

Ans. PORT

5. Why was hanger H-17 revised ?

Ans. TO CLEAR ADJACENT HANGER

6. In the valve list, HS-64 has a + symbol to the left, why ?

Ans. TO SPECIFY ITEM IS N.D.

7. To what block valve is FL-2 attached ?

Ans. HS-35

8. What is the pipe length required for P-2877 ?

Ans. 15' (Fifteen Feet)

9. What pipe or pipes are supported by hanger H-18 ?

Ans. P2538R- $\frac{1}{2}$ ", P2539W- $\frac{1}{2}$ "

10. In what direction is the flow of HS-38 ? (Up or Down)

Ans. UP

11. HS-37 has two lines connected to the top, what are the pipe numbers ?

Ans. P2540- $\frac{1}{4}$ ", P2542- $\frac{1}{4}$ "

12. How far off the baseline is the bottom of HS-36 located ?
Ans. 21' 4"
13. In section view 14A what is the distance between centers of pipes P2539U- $\frac{1}{2}$ " and P2538T- $\frac{1}{2}$ " ?
Ans. 11/16"
14. What type of material is used for HS-35 ?
Ans. Aluminum Alloy
15. How many F-4 fittings are used on this drawing and to what pipes are they attached ?
Ans. 2, P2544 and P2546

TRIDENT STANDARD CROSS REFERENCING SYSTEM

PURPOSE:

THE PRIMARY OBJECTIVE OF THIS HANDOUT IS TO FAMILIARIZE YOU WITH BLUEPRINT (CROSS-REFERENCE) SYSTEM OF STANDARD DRAWINGS ESTABLISHED FOR THE VERIFICATION OF MATERIALS NEEDED TO FABRICATE AND INSTALL A HANGER ASSEMBLY. THIS SAME SYSTEM IS ALSO UTILIZED TO VERIFY THE MATERIALS OF A PRE-FABRICATED ASSEMBLY.

OBTAINTHE NECESSARY PLANS FROM THE PLAN FILE. BE CERTAIN THEY ARE THE LATEST REVISIONS.

FOR MATERIAL VERIFICATION YOU WILL NEED THE HANGER PRINT AND A COMPLETE SET OF TRIDENT HANGER STANDARD DRAWINGS (SEE THE LIST OF PLAN NUMBERS ON THE HANDOUT COVERSHEET).

TRIDENT HANGER DETAIL

87524-9021

TRIDENT HANGER STANDARD DRAWINGS:

2620-286-10	2620-286-13
2620-286-11	2620-286-14
2620-286-12	

STEP I

- A. STARTING WITH THE HANGER DETAIL PLAN. 87524-9071

NOTE PLAN NUMBER IS FOUND IN THE TITLE BLOCK.

- B. GO TO THE INDEX AND LOCATE THE HANGER IN QUESTION, AND THE SHEET NUMBER.

- C. PROCEED TO SHEET NUMBER LISTED.

NOTE

ALWAYS LOOK IN THE INDEX. HANGERS ARE NOT ALWAYS LISTED IN ORDER.

NOTE

THE INDEX IS A GOOD TIME SAVER.

CONTENTS	INDEX		
	1= CUSTID 2= JN 3= SH NO	4= K	5= L
TITLE	001	K	
REVISION	002	K	
INDEX	003	K	
REFERENCES	004	K	
GEN NOTES	005	K	
GEN NOTES	006	K	
INST. NOTES	007	K	
INST. NOTES	008	K	
NH1	009	K	
NH2	010	K	
NH3	011	K	
NH4	012	K	
NH5	013	K	
NH6	014	K	
NH7	015	K	
NH8	016	K	
NH9	017	K	
NH10	018	K	
NH11	019	K	
NH12	020	K	
NH13	021	K	
NH14	022	K	
NH15	023	K	
NH16	024	K	
NH17	025	K	
NH18	026	K	
NH19	027	K	
NH20	028	K	
NH21	029	K	
NH22	030	K	



CUSTID N00024-73-C-0232		DEPARTMENT OF THE NAVY NAVAL SEA SYSTEMS COMMAND WASHINGTON DC 20372		
GENERAL DYNAMICS Electric Boat Division Groton Connecticut				
87524-9071		SSBN TRIDENT CLASS HANGERS MSL GAS N2 BANK NO. 2		
DR CL CHA YAT INAM NRP C TECH C APPO C DATE 10/83		HGR'S MSL GAS N2 BANK NO 2		
APPO AS TYPE 1 DRAWING APPOV10 APPV10 CAT 3		SIZE	FSM NO	NAVSEA DRAWING NO
NAVY APPROVAL NOT REQUIRED		B	80064 704	4644891 K
		SCALE NONE	SHEET 00101 OF 035	

THE DETAIL DRAWING ALSO DESIGNATES THE ITEMS REQUIRED TO MAKE UP A COMPLETE ASSEMBLY. THESE ITEMS ARE DEPICTED AS ENCIRCLED NUMBERS. ①, ②, ③, ⑦ & ⑬ ARE THE ITEM NUMBERS ASSOCIATED WITH THIS HANGER ASSEMBLY.

PARTS LIST

ITEM NO NO SEQ	QTY	U/M	NAME SIZE OR HEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I U/M	PART NUMBER MF MTRL STK NO	SERVICE OR REMARKS	P R H
IT 6006	1	PC	HANGER ASSY	PIPE	N/N	87624-5071 NH6	96169	1644891-0000NHB MF		
IT 6006A	1	PC	HANGER ASSY	PIPE	CLAMP IT STL	2620-286-11 ASSY AG	96169	2445498-0000		X
IT 6006B	1	PC	HANGER ASSY	PIPE	MOUNT & SPRT N/A	2620-286-11 ASSY BCII	96169	2445496-0000N		Y
IT 6006C	1	PC	HANGER ASSY	PIPE	MOUNT LUG SPRT N/A	2620-285-11 ASSY EOH	96169	2445496-0000N	NC	Y
IT 6006F	1	FT	TUBE	SQUARE 2.000 x 2.000 x 0.187HOM	SIL	RSTH-R500	96169	10-03-1668 MF	NC	X
IT 6009	8	IH	BAR	0.600 x 3.000	FL HR SIL	ORAOE B 00-3-761	96169	30-11-0830 MF		X

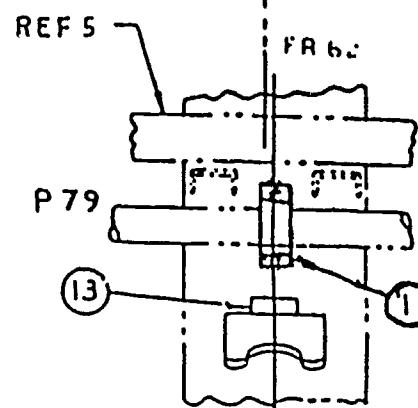
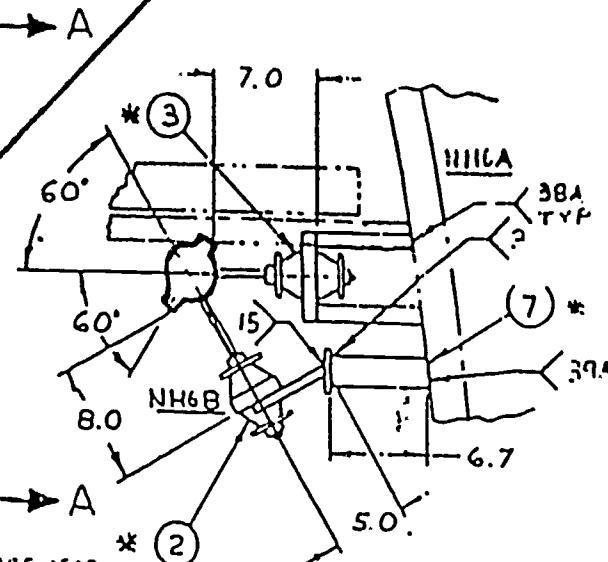
NOTES

1. Remember your theory.
2. Item ① consists of clamp halves, liner and fasteners.
3. Plan No. and Assy found in drawing column of the list of material.
4. Proceed to proper Plan and Assy.

AC7221
HGH REF LOCATION: PANEL 8F ON 87865-1512

HGR. NO.	COLD LOAD	DEFLECTION
NH6A		TNSN
B		CPRSN

SECTION
LOOKING AFT



ELEVATION A-A
LOOKING TO PORT
— FWD —

NH6A
PORT
NH6B

COMING NO NO0024-73-C-0232		HGR'S MSI CAS N2		BANK NO 2	
GENERAL DYNAMICS		GENERAL DYNAMICS		GENERAL DYNAMICS	
Electric Boat Division	General Dynamics	Size	FSM NO.	DRAWING NO	REV
1000 W. Riverfront	1000 W. Riverfront	B	80064	704 4644891	K
Stamford, CT 06901	Stamford, CT 06901	87524-9071	SCALE 1/8	SHEET 01A	64

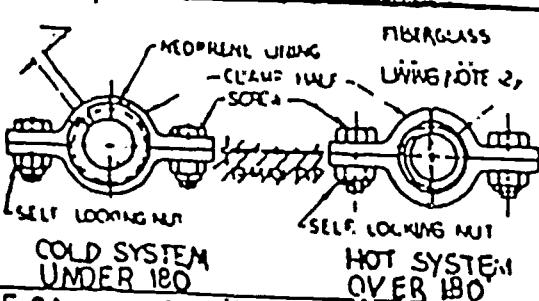


TABLE 2A CLAMP ASSEMBLIES

PLAIN (FOR HOT SYSTEM)

ITEM	1/4	5/16	11/16	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10
ASSY	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P
CLAMP	1PC														R
HOLD	OTC	2	2	2	2	3	6	7	9	10	11	8	13	M10	
FLANGE	ITEM	1	1 1/2	3 1/2	5 1/2	7 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
LOCKING	OTC	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SCREW	ITEM	11/4	42	42	42	42	42	42	42	42	42	42	42	42	42
SELF LKG	REW	11/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8	13/8
HUT	OTC	2	2	2	2	2	2	2	2	2	2	2	2	2	2
STOCK	ITEM	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WREN	OTC	1	2	3	4	5	6	7	8	9	10	11	12	13	14

PLAIN (FOR COLD SYSTEM)

NOTES

1. Plan 2620-286-14, look up assembly AG
 2. Find item numbers for hanger (Clamps) (Liner) (Screw) (Nut)
 3. Description of item number will be found on Plan 2620-286-13

NOTE: Reference to list of material for item numbers is found in the reference block of the plan in which the item numbers were located.

REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
1	2620-286-13	HANGER STANDARD MATERIAL LIST

ITEM-NO	ITEM #	nominal size or weight	TYPE	modifier material
7	7	BAR 0.250 X 2.000	FLAT	HR STL
152	152	CHANNEL .2.250 W 2.000	CH 0.375 H	EXTD NPRY
328	328	NUT 0.375 - 16UNC - 3R	SLFLKG	HEX-GALV STL "
				66

PARTS LIST									
ITEM NO NO SEQ	QTY CLASS	U/M LVC	ITEM NAME SIZE 34-414-"	MODIFIED THICKNESS	DOCUMENT NO DRAWING NO	S/I U/M	ITEM NUMBER M/N HNL SIX NO	SERVICE OR REMARKS	P X M
1 1000	1	"	HANGER ASSY PIPE	"	8754-071 NMB	96169	101091-0000NM 75		x
11 1 6036A	1	"	HANGER ASSY PIPE 100IPS	CLAMP IT SL	2670-25-11 11551 AG	96169	1115198-0000		x
IT 2	1	"	HANGER ASSY PIPE 100LBS	MOUNT & SPRT N/A	2680-286-11 ASSY BDN	96169	2116196-0000BN nf	NC	x
11 5 5006C	PC N	"	HANGER ASSY PIPE 50 LBS	700" 11G SPRT " A	2670-25-11 ASSY BDN	96169	2115195-0000BN 75	NC	x
11 7 6006F	PC N	"	WDL 1000 + .000 + 0.187MM	500IPS SL	NS1-41 WHL	96169	1111-1688 75		x
11 13 6006G	9	IN N	BAR 2 500 + 3.00	SL SL	90-5-11	96169	10-11-0830 nf		x

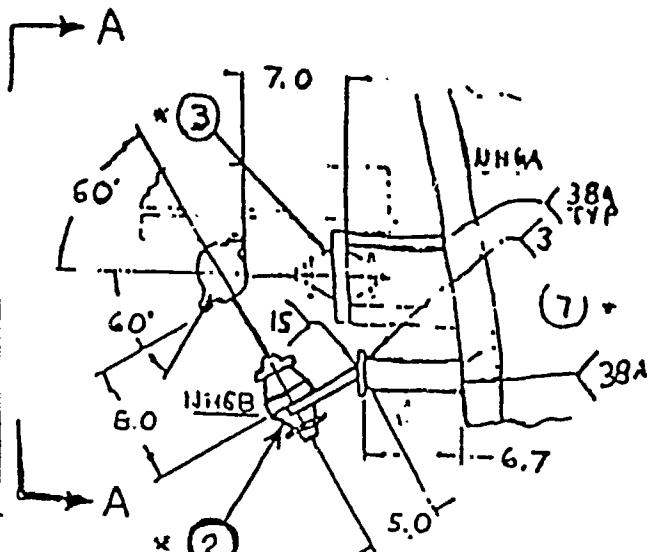
NOTES

1. REMEMBER YOUR THEORY.
2. ITEM 2 (MOUNT & SPRT)
3. ITEM 2 CONSISTS OF
(ROD) (MOUNT) (HEX
NUTS) (SLKG NUT)
(SPRT NUT) (SPRT BOLT
& (SUPPORT)
4. PROCEED TO PROPER
PLAN & ASSY.

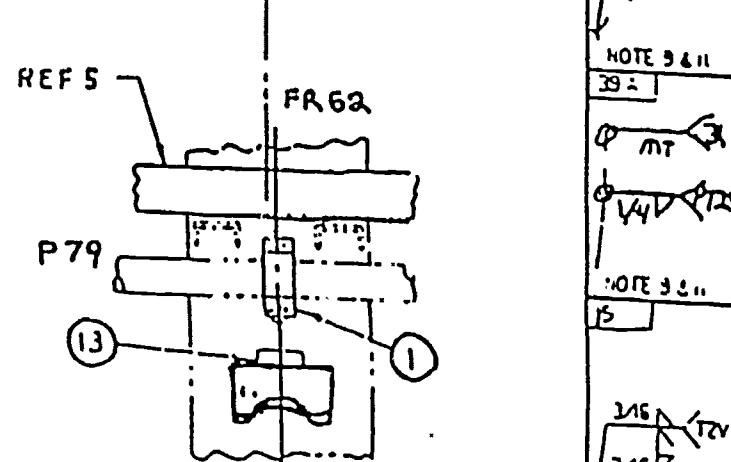
PLAN 2620-286-11, ASSY
BDN

NOTE 21
HGH HLF LOCATION PANEL 8F ON 87865-1512

HGR NO.	COLLUM	DEFLECTION
NH6A	-	TNSN
68		CPRSM



SECTION
LOOKING AFT



ELEVATION A-A
LOOKING TO PORT

NH6A
NH6B PORT

GENERAL DYNAMICS Electric Boat Division 87524 9071	SHE	PSCH NO.	DRAWING NO.
B 80064	704	4644841	K
SCHEM/K			68
SHEET 014			

ANIMAL DYNAMICS
Private Game Division
LAWRENCEVILLE, GA.
2620-286-11

NAVAL SHIP SYSTEMS COMMAND

6 HANGER STANDARD
MOUNTS WITH SUPPORT
ASSEMBLIES 12

\$0064	645	21	5493
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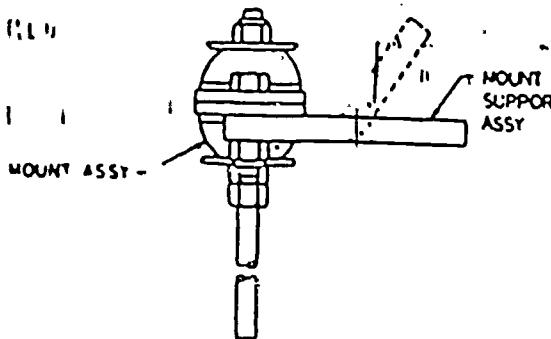


TABLE 2 MOUNT & SUPPORT ASSY.

USE ABOVE BILGE LINE				USE BELOW BILGE LINE			
ASSTY	MOUNT SIZE	MOUNT ASSY TABLE 1517A19	SPRT ASSY TABLE 36 REF 2	ASSTY	MOUNT ASSY TABLE 1517A19	SPRT ASSY TABLE 36 REF 2	
B-1	13"	"TC"	"UL"	B-11	"TB"	"UR"	
B-7	23"	"TC"	"UL"	B-11	"TC"	"UM"	
U-1	10"	"TC"	"UL"	B-10	"TB"	"UX"	
B-1	20"	"TC"	"UL"	B-10	"TB"	"UM"	
B-1	55"	"S"	"UN"	B-5	"SU"	"UP"	
B-1	55"	"S"	"UR"	B-1	"SO"	"US"	
B-3	450"	"IA"	"UT"	B-1	"TB"	"UU"	
B-1	900"	"TC"	"LY"	B-1	"TD"	"UW"	
B-11	5"	"VA"	".."	B-11	"VF4"	"JF"	
B-11	23"	"VM"	"L"	B-11	"VJN"	"UH"	
B-11	23"	"VM"	"UL"	B-11	"VFN"	"UX"	
B-11	100"	"SAN"	"UL"	B-11	"SBN"	"UM"	
B-11	150"	"SCU"	"UN"	B-11	"SD4"	"UP"	
B-11	150"	"SCU"	"UR"	B-11	"SDN"	"JS"	

1. FIND ASSY BDN FOR MTS AND SPRT ASSY ON PLAN 2620-286-11
 2. TABLE 16, 17, & 18 FIND ASSY SAN.
 3. TABLE 16 LOOK UP ITEM NUMBERS FOR ASSY SAN.
 4. START WITH ROD TABLE, GO TO NEXT PAGE

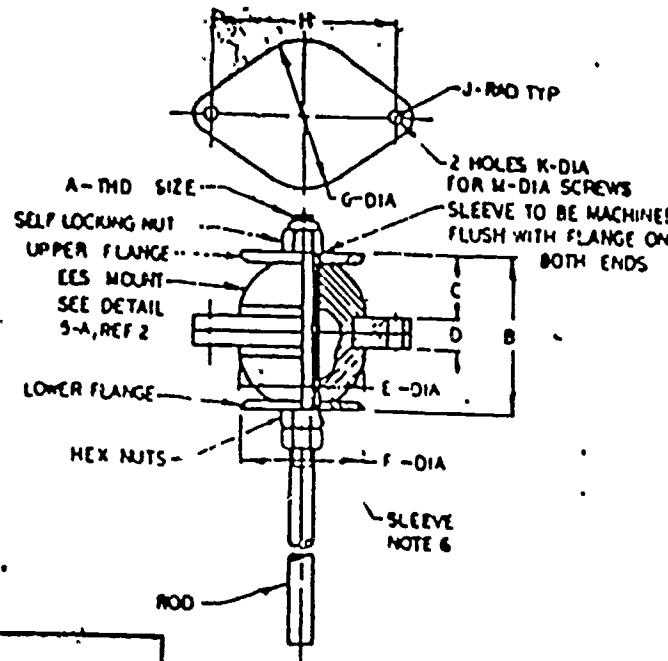


TABLE 16
JES MOUNTS

ASSY	EES MOUNT		ROUTABLE 27 REF 2		SLEEVE DET 8-A REF 2		SELF LKGHNUT		HEX NUT		TABLOC WASHER	
	SIZE	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM	QTY	ITEM
SZ-	100	76	2	138	1	139	1	180	1	187	1	17
SB-	100	76	2	26	1	39	1	211	1	292	1	25
SC-	100	75	2	181	1	140	1	180	1	187	1	25
SD-	100	73	2	26	1	45	1	211	1	187	1	25
SAN	100	75	1	8	1	139	1	293	1	187	2	
SN	100	75	1	26	1	139	1	211	1	187	2	
SCN	150	75	1	18	1	140	1	293	1	187	2	
SDN	150	75	1	26	1	140	1	211	1	187	2	

DIMENSIONS FOR LAYOUT PURPOSES ONLY

SIZE	A	B	C	D	E	F	G	H	J	K	L
100#	S _b -IIUNC-2A	4.0t	137	.88	3.00	3.00	3.30	4.73	.56	3.46	1.14
150#	S _b -IIUNC-2A	4.14	137	1.00	3.25	3.25	3.50	5.38	.62	4.74	1.52

NOTES

1. ITEM'S ASSY SAN 18 293 187 TABLE 16
2. ITEM 18 SAY'S ROD TABLE 27 REF 2 ITEM 18
3. TO FIND REF 2 LOOK IN REF BLOCK OF THE PLAN IN WHICH YOUR ITEM NUMBER'S WERE FOUND

NOTE: ALL DIMENSION'S ARE LETTERED ABOVE TABLE 27

EXAMPLE: A-DIA is 5/8

NOTE: ALWAYS REMEMBER TO LOOK IN REF BLOCK BEFORE GOING TO ANOTHER PLAN.

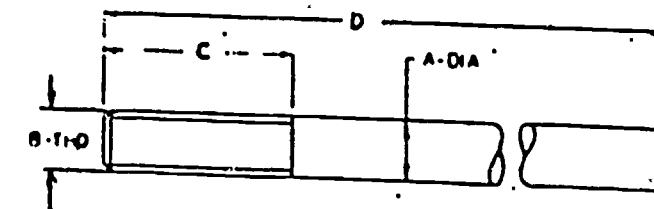


TABLE 27 MOUNT ROD

TYPE MOUNT	SIZE	ITEM	A	B	C	D
ME	15°	16		1 1/4	-20UNC-2A	3 19 18CC
		21	4			
	25°	13	3	3	-16UNC-2A	4 25 1800
	50°	23	5	3/8		
EES	100°	17	5	2	-11UNC-2A	7 00 1800
	150°	18	6	2	-11UNC-2A	9.75 2400
	100°	26	5	2	-11UNC-2A	9.75 2400
	150°	27	6	2	-11UNC-2A	9.75 2400
	450°	19	3	3	-10UNC-2A	9.75 2400
	900°	20	1	1	-8UNC-2A	12 1/2 2400
	2000	21	1	1	-8UNC-2A	12 1/2 2400
	4000	22	1	1	-8UNC-2A	12 1/2 2400
SPOOL	15°	12	2	1/2	-18UNC-2A	300
		22	16	1/2	-18UNC-2A	300
	50°	13	3	1/2	-16UNC-2A	425
		23	3	1/2		
	100°	14	2	2	13UNC	5.00
		24	2	2		
	200°	15	2	2	11UNC-2A	6.50
EES	400°	23	2	2	11UNC-2A	6.50
	800°	24	2	2	11UNC-2A	6.50
	1600°	25	2	2	11UNC-2A	6.50
	3200°	26	2	2	11UNC-2A	6.50
MI	15°	27	1	1	11UNC-2A	6.50
	383	28	1	1	11UNC-2A	6.50

REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2820-286-10	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL LIST

GENERAL DYNAMICS Electric Boat Division San Diego, California		NAVAL SHIP SYSTEMS COMMAND San Diego, California	
2620-286-11			
HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES			
W.M. STEPHEN	41 2551	41 2551	41 2551
20064	3451 24:5495	L	
REV 10/14/71	14111011		

NOTES

1. Sheet No. 6 look for assy for sprt plate
2. Assy UL Table 36 Ref 2
3. Ref 2 is standard 2620-286-12
4. All information under assy UL
5. All dimensions are lettered above table
6. Example: A = 4.75 under assy UL
7. Go to proper list of material for item numbers

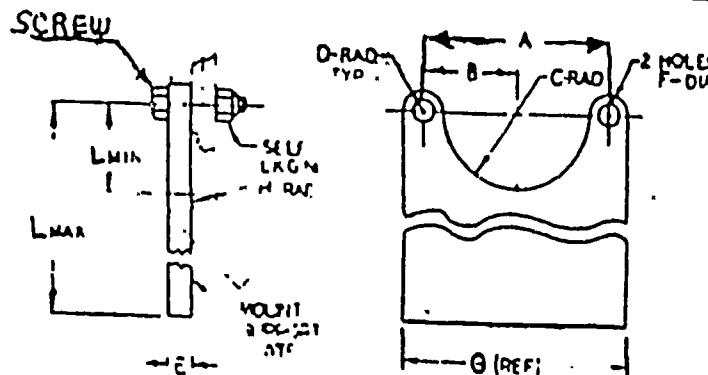


TABLE 36 M1 & EES MOUNT SUPPORT ASSY'

ASSY SIZE	15	15	25	25	50	50	00	00	00	150	150	150	150	150	150	150	150	150	150
SCREW	ITEM 43214	47215	150216	57219	146221	14622	146222	146222	146222	146222	146222	146222	146222	146222	146222	146222	146222	146222	146222
QTY	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
SELF LKG MUT	ITEM 103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207	103207
MOUNT	ITEM 74	75	75	75	77	78	79	79	80	80	80	80	80	80	80	80	80	80	80
SPRT PLATE	QTY	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
DIMENSIONS FOR MOUNT SUPPORT	A	2.00	3.50	3.50	4.75	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38
	B	1.00	1.15	1.75	2.38	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69	2.69
	C	.78	1.19	1.19	1.56	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
	D	.22	.56	.56	.81	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88
	E	1/4	1/2	1/2	5/8	5/8	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
	F	19/64	23/64	27/64	35/64	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16	11/16
	G	2.44	4.62	4.62	6.38	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14	7.14
	H	.25	.50	.50	.62	.62	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
	I	1.25	10.50	7.50	8.00	6.00	8.75	5.25	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
	W/H	.00	1.45	1.45	2.00	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10

REFERENCE DRAWING'S

REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2620-286-11	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL LIST

GENERAL DYNAMICS Electric Boat Division Groton, Connecticut Contractor to NAVFAC		DEPARTMENT OF THE NAVY NAVAL SHIP SYSTEMS COMMAND WASHINGTON DC 20372	
2620-286-10		HANGER STANDARD MOUNTS WITH SUPPORT MATERIAL	
ASSEMBLY DRAWING EQUIPMENT DRAWING NO. DATE		HANGER STANDARD MOUNTS WITH SUPPORT MATERIAL	
NAVY APPROVAL NOT REQUIRED		H 80064 845 2445494 P	
SCALE/MODEL		DATE	

LIST OF MATERIAL

PARTS OF MOUNTS

ITEM	ITEM CLASS	NAME	QUANTITY	SIZE	WEIGHT	TYPE	MANUFACTURER	DOCUMENT NO.	C/I	PART NUMBER
187	0	PC NUT	1	0.028	0.004	PI	HEX	MS-N-A74 NO 98169	60-08-41	
293	0	PC NUT	1	0.628	11.00G-38	SFLKG	HEX CALV	MS-17829 MIL-N-25027 00-Z-325 TY 2 CL 2 OR 3	96160	60-08-2264
18	0	PC BAR	1	0.028	0.004	RD	7A	02-3-N 98189 3/2-C1-7810		

PARTS OF SUPPORT

292	0	PC NUT	1	0.500	13UNC-30	SFLKG	HEX CALV	MS-17829 MIL-N-25027 00-Z-325 TY 2 CL 2 OR 3	96160	60-08-2262
77	0	PC NUT	1	0.028	1IN	SIL	CL 8-71	98189	20-07-0826	
157	0	PC SCREW	1	0.000	13UNC-30X.500	CRP	HEX NO 21L	MS-B-057 (MOQ) 98189	60-08-0261	

PARTS LIST											
ITEM NO NO	QTY SEC	CLASS CL	U/M LVL	NAME SIZE OR HEIGHT	TYPE PIPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I U/H	PART NUMBER MF MATEL STK NO	SERVICE OR REMARKS	P R N
5006	1	PC	N	HANGER ASSY	PIPE	N/A	07624-5071 NH6	96169	4641091-0000NH6		
5006A	1	PC	N	HANGER ASSY	PIPE	CLAMP TY 2.000IPS	2620-286-11 ASSY NO	96169	244S490-0000		X
5006B	1	PC	N	HANGER ASSY	PIPE	MOUNT & SPRT 100 LBS	2620-286-11 ASSY B&H	96169	244S496-0000NH		X
5006C	1	PC	N	HANGER ASSY	PIPE	MOUNT LUG SPRAT 100 LBS	2620-286-11 ASSY EDN	96169	244S496-000EDN	NC	X
6006F	1	IN	IN	PIPE	SQUARE 2.000 x .000 x 0.187MM	SIL	1051M-AS30	96169	4641091-1568 MF		X
6006G	1	IN	IN	BAR	.0.600 x 3.000	FL	1051M-AS30	96169	30 11-0830		X

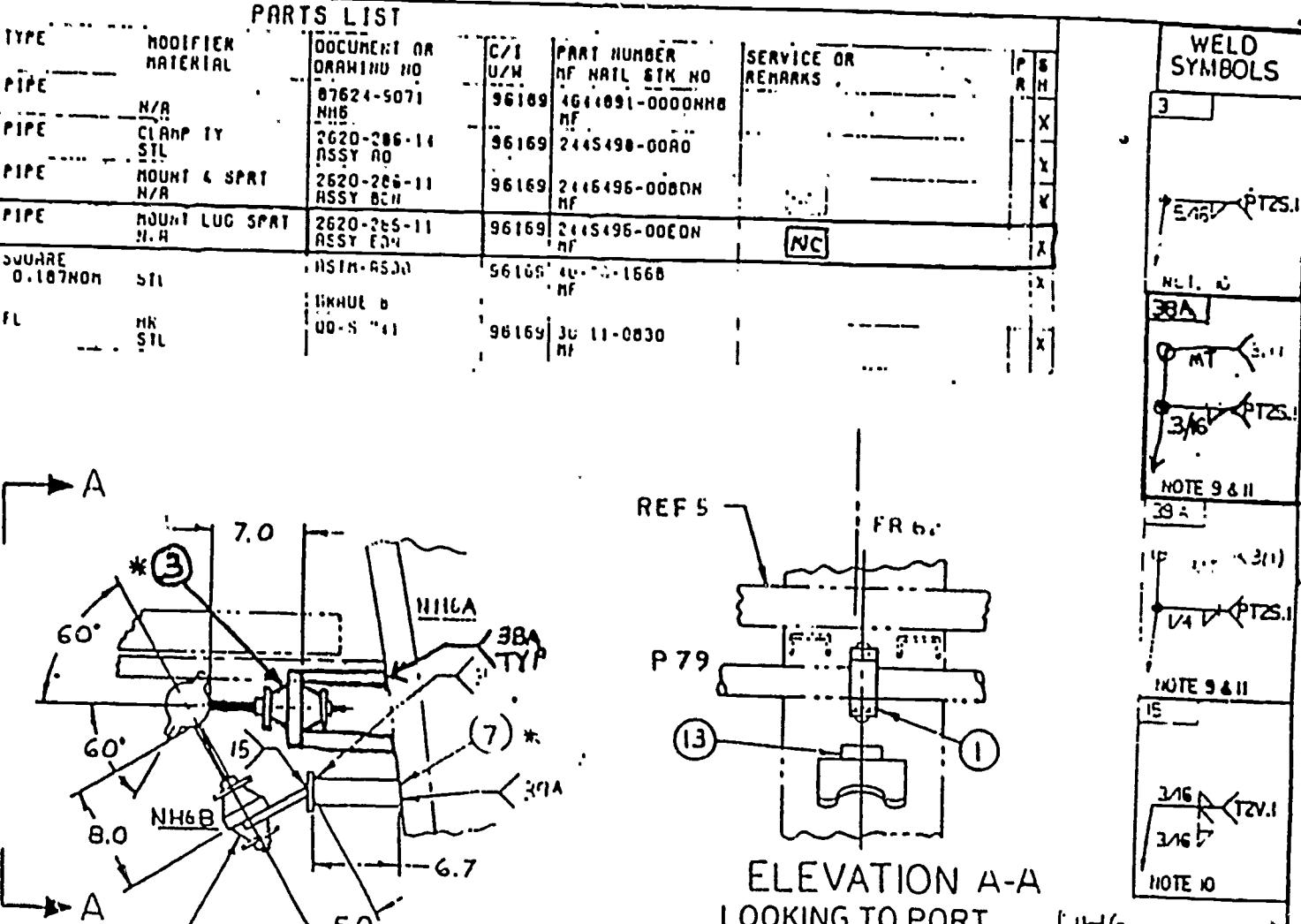
NOTES

1. Remember your theory
 2. Item 3 mount & lug, sprt
 3. Item 3 consists of (mount) (rod) (slkg nut) (Hex headnuts) (sprt nut) (sprt bolt) and lugs
 4. Proceed to proper plan and assy
- Plan 286-11 assy EDN

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SECTION
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Contract No. 100-1473-C-0232	MSI	CA'S	NZ	BANK	NC
GENERAL DYNAMICS					
Electric Boat Division					
Stamford, CT 06904					
877-141071	SCM NO			DRAWING NO	
	B 80064	1.1.1		1448-11	K
	SCALE 1/8			SHEET 014	

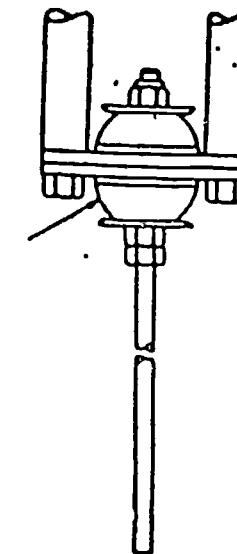


NOTES

1. On assy EDN assy SAN is the same as Item 2 Go on to lug sprt.
2. Lug support Table 30 & 31 Ref 2, assy M, size 3
3. Ref 2 is found in the ref block of the drawing which the items were found.
4. Proceed to proper plan & assy.

Ref 2 Table 30 & 31 assy M

NOTE: Remember size & type of MT.



GENERAL DYNAMICS Electrical Divison		NAVAL SHIP SYSTEMS COMMAND		
2620-286-11				
HANGER STANDARD MOUNTS WITH SUPPORT ASSEMBLIES				
WIRE STIFF NYL THT STNDRT ASSY				
Y-N3-545	80060	645	24-5495	L
NOT FOR PARTS				

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TABLE 5 MOUNT & LUG SUPPORT ASSY

ASSY	MOUNT SIZE	MOUNT ASSY TABLE	LUG SUPPORT TABLE 30 & 31 REF 2			ASSY	MOUNT ASSY TABLE	LUG SUPPORT TABLE 30 & 31 REF 2		
			16, 17 & 19	ASSY	SIZE QTY			16, 17 & 19	ASSY	SIZE QTY
EDN	100°	30	RJ	1	2	EDN	48	PK	2	2
EG	120°	40	X	1	2	EG	60	S	2	2
EG	150°	40	X	1	2	EG	60	S	2	2
EO	100°	50	X	1	2	EO	50	U	2	2
EO	150°	50	X	1	2	EO	50	U	2	2
EF	150°	50	X	1	2	EF	50	Y	2	2
EF	450°	TA	H	4	2	ET	78	V	10	2
EG	900°	TC	PY	3	2	EU	70	W	11	2
EH	2000°	TE	R	6	2	EV	TF	Y	12	2
EW	2000°	TL	R	6	2	EY	TM	Z	12	2
EJ	2000°	TR	R	6	2	EL	TP	Y	12	2
EJ	3000°	TU	N	6	2	EZ	TV	Y	12	2
EAN	15°	VAN	RA	1	2	EHN	VBN	PK	2	2
EON	25°	VCN	K	1	2	EHN	VON	S	7	2
EJM	150°	VEN	IL	2	3	EPM	VFN	T	8	2
EDN	100°	SAN	M	3	2	ERN	SBM	U	9	2
EEM	150°	SCM	LN	4	2	E3M	SDM	V	10	2
						ELM	TP	Z	12	2
						E2M	TV	Z	10	2
						EYR	TFR	Z	12	2
						EYR	TGR	Z	12	2

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REF#	DRAWING NUMBER	DESCRIPTION OF PLAN
2	2620-286-12	HANGER STANDARD MTS & SPRT
1	2620-286-10	HANGER STANDARD MATL. LIST

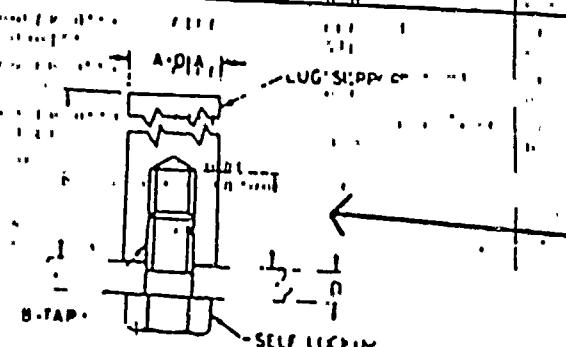


TABLE 30 LUG SUPPORT ASSY					
USE ABOVE BILGE LINE		USE BELOW BILGE LINE			
ASSY SIZE	MOUNT SIZE	LUG SCREW	ASSY SIZE	MOUNT SIZE	LUG SCREW
1 1/2	1/2	103	8	7	29 MI
2	3/4	49	124	1	8
M 3	100° EES	50	165	U	9 100° EES
N 4	100° EES	51	166	V	10 100° EES
P 5	100° EES	52	167	W	11 100° EES
R 6	2000"	232	167	2	12 2000"

DIMENSIONS FOR LUG SUPPORTS					
SIZE	A	B	C	D	E
1 1/2	3/4	16	-18UNC-2B	1.2	.38 2.00
2 6/8	1	1/2	-16UNC-2B	1.00	.50 1.00
3 1/2	1	1/2	-13UNC-2B	1.00	.39 2.00
4 6/10	1	1/2	-11UNC-2B	1.50	1.90 1.50
5 11/11	1	3/4	-10UNC-2B	2.00	1.30 1.00
6 6/12	1 1/3	2	-9UNC-2B	1.5	1.25 .50

NOTE'S	
1. Ref II 2620-286-12	
2. Table 30 Assy M, Size 3	
3. Dimensions for lugs are below Table 30 by size.	
4. Dimensions are lettered and found above the table.	
NOTE: Description of each Item No. is found in proper list of material.	

DEPARTMENT OF THE NAVY NAVAL SHIP SYSTEMS COMMAND WASHINGTON DC 20370	
2620-286-10	
ITEM NO.	DESCRIPTION
1	ASSEMBLY
2	DRAWING
3	DATE
4	REVISION
5	MADE BY
6	APPROVAL
7	NOTES
8	SCALING
9	REMARKS
10	REMARKS
11	REMARKS
12	REMARKS
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PARTS LIST											
ITEM NO NO SEQ	QTY	U/M	NAME SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I U/H	PART NUMBER MF HATL STK NO	SERVICE OR REMARKS	P R	M
6006	1	PC	HANGER ASSY	PIPE	N/R	87624-5071 NH6	96169	1811891-0000NH8 MF		R	M
IT 1	1	PC	HANGER ASSY	PIPE	CLAMP IT 2.000IPS	2620-286-16 ASSY RD	96169	2115198-0000		X	
IT 2	1	PC	HANGER ASSY	PIPE	SIL 100 LBS	2620-286-11 ASSY B/C	96169	2115196-0000H MF		Y	
IT 3	1	PC	HANGER ASSY	PIPE	NOUNT L SPRT 100 LBS	2620-286-11 ASSY EDN	96169	2115196-0000EON MF	(NIC)	Y	
IT 7	1	FT	TUBE	SQUARE 2.000 x 2.000 x 0.187INCH	STL	ASIM-A590	96169	10-00-1668 MF		X	
IT 13	1	IN	BAR	0.600 x 3.000	FL STL	GRROE 5 00-S-741	96169	10-11-0830 MF		X	

NOTES

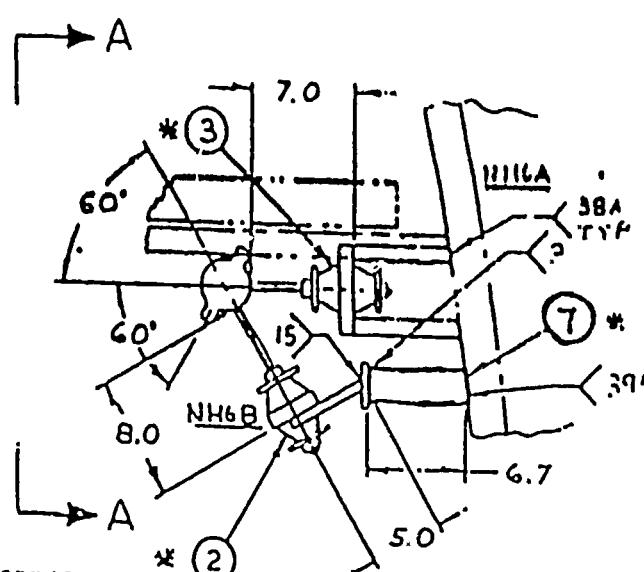
- i. Item No. ⑦ in parts list gives all the information needed.

NOTE

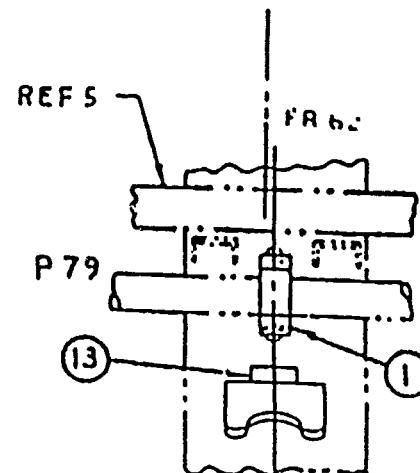
If any further information was needed the plan would supply a Ref drawing in the drawing number column.

NOTE 21
HIGH REF LOCATION: PANEL B8 ON 87865-1512

HGR. NO.	COLD LOAD	DEFLECTION
NH6A	—	TNSN
NH6B	—	CPBSN



SECTION LOOKING AFT



ELEVATION A-A
LOOKING TO PORT
~~FWD~~ A

NH6A
NH6B PORT

Contract No. NO00024-73-C-0232		HGR'S M.S.I. GAS N2 BANK NO 2				
GENERAL DYNAMICS		SHE	ISCH NO	DRAWING NO		REV
<i>Electric Boat Division General Dynamics New London</i>	B	80064	704	1644891		K
87524-0071	SCALE 1/8		SHEET 01A			

PARTS LIST											
ITEM NO NO	QTY SEQ	U/M CLASS	NAME SIZE OR WEIGHT	TYPE	MODIFIER MATERIAL	DOCUMENT OR DRAWING NO	C/I SN	PART NUMBER OF HAIL STK NO	SERVICE OR REMARKS	P RIN	WELD SYMBOLS
6 6006	1	PC IN	HANGER ASSY	PIPE	N/A	83624-9071 NH6	5169	1611091-0000NH0 NF		X	3
11 6006B	1	PC IN	HANGER ASSY	PIPE	CLAMP IT SIL	2620-286-14 ASSY A0	5169	2445498-0000		X	5/16 PTCS.1
11 6006C	1	PC IN	HANGER ASSY	PIPE	MOUNT L SPRT N/A	2620-286-11 RSST B0H	96169	2445496-0000DN NF	(1C)	X	5/16 PTCS.1
11 6006C	1	PC IN	HANGER ASSY	PIPE	MOUNT LUG SPRT N/A	2620-286-11 RSST C0H	96169	2445496-0000DN NF	(1C)	X	5/16 PTCS.1
11 6006F	1	FT IN	TUBE	SQUARE 2.000 x 2.000 x 0.187H0H	SIL	ASIN-AS00	96169	40-00-1660 NF		X	3/16 PTCS.1
11 60080	3	IN IN	BAR	0.600 x 3.000	FL HR SIL	00-S-711	96169	30-11-0830 NF		X	NOTE 9 & 11 3/16 PTCS.1

NOTES

1. Item No. (13) in parts list gives all the information needed.

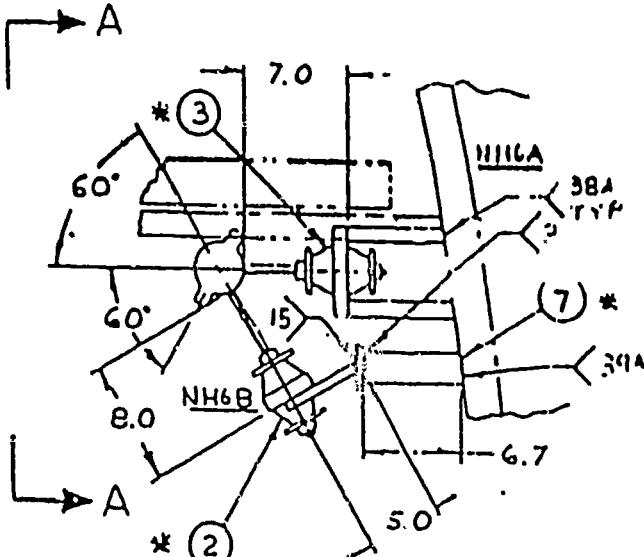
NOTE:

If any further information was needed the plan would supply a Ref drawing in the drawing number column.

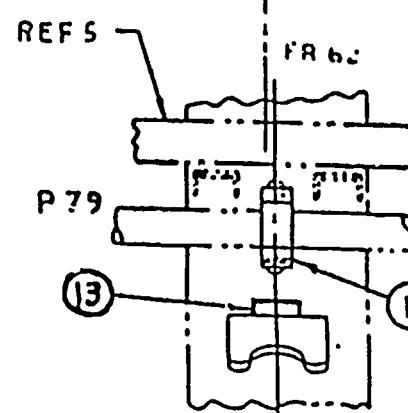
NOTE 21

HIGH REF LOCATION: PANEL BF ON 87865-1512

HER. NO.	COLD LOAD	DEFLECTION
NH6A		TNSN
NH6B		CPRSN



SECTION
LOOKING AFT



ELEVATION A-A
LOOKING TO PORT

NH6A PORT
NH6B PORT

CONTRACT NO 0001024-73-C-0232	IGRS' MSI	GA'S N2	BANK NO 2
GENERAL DYNAMICS		SCALE 1/8	REV K
Electric Boat Division	ISCM NO	DRAWING NO	
A7524-9071	B 80064	704 4644891	
SHEET 014			

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

HANDOUT: TRIDENT Class Cross-Referencing System
Dwgs. 87524-9071 R/K, 2620-286-10 R/N, 2620-286-11 R/K
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G,
Student Material List Answer Sheet

Part One of Three:

Instructions:

Discuss Cross-Referencing System using H/O only.

Part Two of Three:

Instructions:

Issue plans listed on lead sheet of handout. Follow
the format shown on handout using standard plans.

Part Three of Three:

Instructions:

Completely identify hanger H-5 using cross-referencing
system without the use of the handout. Student Material
List Answer Sheet will be used for all answers.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Dwgs. 87524-4006 R/D, 2620-286-10 R/N, 2620-286-11 R/K,
2620-286-12 R/M, 2620-286-13 R/H, 2620-286-14 R/G
Student Material List Answer Sheet

Question 1

Using cross-referencing system identify all parts of
hanger H5-2.

List all answers in order on answer sheet

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87524-4006 R/D

Instructions:

Give complete answers to all questions.

1. What does hanger H35-2 support ?
Ans.
2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
Ans.
3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
Ans.
4. What is the angle of the outboard leg of hanger H23-1 ?
Ans.
5. What is the ship's attachment weld for hanger H6-2 ?
Ans.
6. What does hanger H26-2 support ?
Ans.
7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
Ans.
8. How many degrees off the center of the flex should the U-Bolt welded on hanger H27-1 ?
Ans.
9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
Ans.
10. What does hanger H23-2 support ?
Ans.
11. What is the total length of the angle bar used on hanger H42-2 ?
Ans.
12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on hanger H35-1 using the elevation view ?
Ans.

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B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans.
14. What does hanger H37-2 support ?
Ans.
15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans.
16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans.
17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans.
18. What is the minimum overall dimentions of the block after taking the maximum cut on Pc. 122-2 ?
Ans.
19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans.
20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans..

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87524-4006 R/D

Instructions:

Give complete answers to all questions.

1. What does hanger H35-2 support ?
Ans. F-2 Flex Hose Assy.
2. What is the pipe no. of the aft pipe that hanger H28-2 supports ?
Ans. P237
3. What clearance must be maintained from the hull on the upper support on hanger H32-2 ?
Ans. 3.0"
4. What is the angle of the outboard leg of hanger H23-1 ?
Ans. 35 Degrees
5. What is the ship's attachment weld for hanger H6-2 ?
Ans. 3/8" fillet weld all-around
6. What does hanger H26-2 support ?
Ans. P295 & P336
7. How far from the edge of the frame would you attach the support plate for hanger H33-2 ?
Ans. 0.8"
8. How many degrees off the center of the flex should the U-Bolt rolled on hanger H27-1 ?
Ans. 5 Degrees
9. When attaching the rod to the clamp on hanger H5-2 what size weld would be required ?
Ans. 3/16" all-around
10. What does hanger H23-2 support ?
Ans. P132
11. What is the total length of the angle bar used on hanger H42-2 ?
Ans. 8.1"
12. At what angle would Pc. 136-2 be cut to attach to Pc. 136-5 on hanger H35-1 using the elevation view ?
Ans. 35 Degrees

B-28 cont.

Lesson Number (cont.)

13. What will hanger H26-2 be attached to onboard ship ?
Ans. TRIDENT Subbase
14. What does hanger H37-2 support ?
Ans. P328
15. What is the distance between the clamp and support plate on hanger H44-2 ?
Ans. 10.0 "
16. How much of a pitch is item 122-2 set off horizontal on hanger H28-2 ?
Ans. 3 Degrees off horizontal
17. When attaching item 121-1 to item 121-2 what size weld would be used ?
Ans. None (Items are bolted)
18. What is the minimum overall dimensions of the block after taking the maximum cut on Pc. 122-2 ?
Ans. 18.3L X 1.00thk x 3.87W
19. How many degrees will the clamps be rolled on hanger H30-2 ?
Ans. 55 Degrees
20. When attaching the support plates together on hanger H31-2 what size weld would be required ?
Ans. $\frac{1}{2}$ " weld

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required: 87742-1702 R/G

Instructions: Give Three Point Locations For The Following Hangers

1. H1-2
2. H4-2
3. H11-2
4. H10-2 (no height dimension)
5. H3-2
6. H2-2
7. H12-2
8. H6-2
9. H7-2
10. H9-2 (no height dimension)
11. H5-2
12. H8-2
13. How far above the main axis is SSTG Set No. 1 ?
14. How far apart are hangers H4-2 and H10-2 ? (fwd & aft)
Ans. 11' 4" Fwd
11' 4" Aft
15. What is the distance between hangers H11-2 and H12-2 ? (port to stbd)
Ans. 24' 7.0" Port to stbd
6. H6-2
Ans. 12' 4.5" Fwd
6' 2" Above main axis
13' 7" Port of stbd
9. H7-2
Ans. 17' 9.0" Fwd
33" Above main axis
12' 11.5" Stbd

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B-28 PIPEHANGER BLUEPRINT READING

Lesson Number (Answer Sheet)

1. H1-2
Ans. 18'7" Fwd. centerline 2nd reduction gear
15'7" Stbd of centerline
44" Above Main Axis
2. H4-2
Ans. 10'7.8" Fwd. centerline 2nd reduction gear
43.1" Above Main Axis
13' Port of centerline
3. H11-2
Ans. 12'4" Stbd of centerline
72.1" Above Main Axis
27'7.0" Fwd. centerline 2nd reduction gear
4. H10-2 (no height dim)
Ans. 23'0.2" Fwd. centerline 2nd reduction gear
12'11.6" Port of centerline
5. H3-2
Ans. 43.1" Above Main Axis
10'7.8" Fwd 2nd reduction gear centerline
13' Stbd of centerline
6. H2-2
Ans. 18'7" Fwd 2nd reduction gear centerline
15'7" Port of centerline
44" Above Main Axis
7. H12-2
Ans. 12'4" Port of centerline
72.1" Above Main Axis
24'7.0" Fwd 2nd reduction gear centerline
8. H6-2
Ans. 12'4.5" Fwd 2nd reduction gear centerline
6'2" Above Main Axis
13'7" Port of centerline
9. H7-2
Ans. 17'9.0" Fwd 2nd reduction gear centerline
33" Above Main Axis
12'11.6" Stbd of centerline

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10. H9-2 (no height dim.)
Ans. 23'9.2" Fwd 2nd reduction gear centerline
12'11.6" Stbd of centerline
11. H5-2
Ans. 12'4.5" Fwd 2nd reduction gear centerline
13'7" Stbd of centerline
6'2" Above Main Axis
12. H8-2
Ans. 17'9.0" Fwd 2nd reduction gear centerline
33" Above Main Axis
12'11.6" Port of centerline
13. How far above the main axis is SSTG Set No.1 ?
Ans. 8'2.5" AMA
14. How far apart are hangers H4-2 and H10-2 ? (Fwd & Aft)
Ans. 12'4.4"
15. What is the distance between hangers H11-2 & H12-2 ? (Port & Stbd)
Ans. 24'8.0"

16. How far above main axis is center of centerline
17. How far aft
18. What Reference line for centerline does this refer to
19. Other location required will be the same as the one above
for all intermediate locations
20. What Reference line for centerline does this refer to
21. What Reference line for centerline does this refer to

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
Ans.
2. What type of fitting is used to connect P8-3 to P8-2?
Ans.
3. How far off the vertical is GS-15 rolled?
Ans.
4. In what direction is the flow for F-32?
Ans.
5. What type of fitting is F-16?
Ans.
6. In which direction is the flow for GS-5?
Ans.
7. How far port or stbd of C_L is the F-22 that is attached to P8-1?
Ans.
8. How far fwd or aft of the frame is GS-75-GA-03 located?
Ans.
9. How far above main axis is hanger H15-1 located?
Ans.
10. How far from the Ref to C_L is hanger H2-1 located?
Ans.
11. What Reference and Plan number would give the details of GS-75-GA-03?
Ans.
12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
Ans.
13. What Reference and Plan number would give the hanger details?
Ans.
14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
Ans.
15. When reading a blueprint and a discrepancy is found, who must be notified?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3101 R/E

1. How far above the main axis would you locate hanger H-6?
Ans. 27.5"
2. What type of fitting is used to connect P8-3 to P8-2?
Ans. F-2 90 Degree Elbow
3. How far off the vertical is GS-15 rolled?
Ans. 15 Degrees
4. In what direction is the flow for F-32?
Ans. Fwd.
5. What type of fitting is F-16?
Ans. Concentric Reducer 3.00 X 2.00 IPS
6. In which direction is the flow for GS-5?
Ans. Fwd.
7. How far port or stbd of C_L is the F-22 that is attached to P8-1?
Ans. Right on the C_L
8. How far fwd or aft of the frame is GS-75-GA-03 located?
Ans. 17' 3" Fwd of Ref to RFR
9. How far above main axis is hanger H15-1 located?
Ans. 99.0" AMA
10. How far from the Ref to C_L is hanger H2-1 located?
Ans. 101.0" Stbd
11. What Reference and Plan number would give the details of GS-75-GA-03?
Ans. Ref. 18 87728-1502
12. When locating hanger H22-1 aboard ship what valve would you use for an approximate location?
Ans. GS-15
13. What Reference and Plan number would give the hanger details?
Ans. Ref. 12 87524-4801
14. In the general notes what must be considered before using the tolerance block for pipehanger locations?
Ans. G.N. 48 (Installation of surrounding Equipment)
15. When reading a blueprint and a discrepancy is found, who must be notified?
Ans. Your Supervisor

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off C_L would you install GS-10?
Ans.
2. How far above or below main axis would you install hanger H4-3?
Ans.
3. How far off C_L is MS-3 installed?
Ans.
4. How far off the centerline would you install Ident hanger number 2?
Ans.
5. How far off C_L would you install Ident hanger number 3?
Ans.
6. How far stbd. of C_L would you install the F-28 that is attached to P79-3?
Ans.
7. What size and type fitting is F-4?
Ans.
8. Between what frames would the C_L of the steam chest be located?
Ans.
9. How far above main axis would FL-5 be located?
Ans.
10. How far above the main axis and on what pipe would H12-3 be located?
Ans.
11. To what pipe does F-9 attach?
Ans.
12. Give the three point location for GS-75-DP-05.
Ans.
13. Where would the information be found to fabricate F-26?
Ans.
14. What is the total length required for P71?
Ans.
15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3103 R/P

1. How far off C_L would you install GS-10?
Ans. 2" Stbd
2. How far above or below main axis would you install hanger H4-3?
Ans. 19" AMA
3. How far off C_L is MS-3 installed?
Ans. 187" Stbd of Ref to C_L
4. How far off the centerline would you install Ident hanger number 2?
Ans. 11' 4" Stbd
5. How far off C_L would you install Ident hanger number 3?
Ans. 160.5" Stbd of Ref to C_L
6. How far stbd. of C_L would you install the F-28 that is attached to P79-3?
Ans. 12' 9.5" Stbd of Ref to C_L
7. What size and type fitting is F-4?
Ans. 1.500 Flex-Hose Assy
8. Between what frames would the C_L of the steam chest be located?
Ans. Fr. 123 & Fr. 124
9. How far above main axis would FL-5 be located?
Ans. 9' 2.1"
10. How far above the main axis and on what pipe would H12-3 be located?
Ans. 61.2" AMA on P75-2
11. To what pipe does F-9 attach?
Ans. P-79
12. Give the three point location for GS-75-DP-05.
Ans. 185.5" Stbd, 121" AMA, 13" Ref to C_L 2nd Red Gear
13. Where would the information be found to fabricate F-26?
Ans. 87201-0750 It. 3
14. What is the total length required for P71?
Ans. 6 Feet
15. Between Frs. 123 and 124 how many degrees would P41-1 be bent to attach to FL-2?
Ans. 30 Degrees

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
Ans.
2. What is the material of the fasteners used for FL-3?
Ans.
3. In which direction is the flow for GS-8, Port or Stbd?
Ans.
4. How far off C_L is the F-21 that is attached P72-4?
Ans.
5. How far of C_L and how far fwd or aft of the frame is H3-4 located?
Ans.
6. Give all dimensions to locate GS-75-DP-06?
Ans.
7. What is the distance between Ident Hgrs. 3 & 4?
Ans.
8. What valve is used to feed GS-75-DP-06?
Ans.
9. What type of Assy is F-22?
Ans.
10. How far above the main axis would you install F-22?
Ans.
11. How far above the main axis is hanger H-7?
Ans.
12. What is the distance between Ident H2 from GS-75-DP-06?
Ans.
13. What is the minimum bend radius for .250 OD tubing?
Ans.
14. What will be the thickness of the insulation for P72?
Ans.
15. How far from the C_L turbine is SSTG set turbine #2?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-3104 R/F

1. How far fwd or aft of the frame and above or below the main axis is FL-6 located?
Ans. 2.2" Fwd RFR 124, 9'2.1" AMA
2. What is the material of the fasteners used for FL-3?
Ans. Galvanized Steel
3. In which direction is the flow for GS-8, Port or Stbd?
Ans. Port
4. How far off C_L is the F-21 that is attached P72-4?
Ans. 15' 10.8" Port of Ref to C_L
5. How far of C_L and how far fwd or aft of the frame is H3-4 located?
Ans. 8' 2.3" Port, 19.5" Aft RFR 124
6. Give all dimensions to locate GS-75-DP-06?
Ans. 12'11.0" Port, 19.0" Aft 2nd Red Gear C_L, 92.0" AMA
7. What is the distance between Ident Hgrs. 3 & 4?
Ans. 29.5"
8. What valve is used to feed GS-75-DP-06?
Ans. GS-28
9. What type of Assy is F-22?
Ans. Flex-Hose
10. How far above the main axis would you install F-22?
Ans. 27.2" AMA
11. How far above the main axis is hanger H-7?
Ans. 26" Abv Ref to MA
12. What is the distance between Ident H2 from GS-75-DP-06?
Ans. 75"
13. What is the minimum bend radius for .250 OD tubing?
Ans. G.N. 22 9/16" Radius
14. What will be the thickness of the insulation for P72?
Ans. 1" G.N. 15
15. How far from the C_L turbine is SSTG set turbine #2?
Ans. On C_L Turbine

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
Ans.
2. What type of valve is GS-24?
Ans.
3. How far off the horizontal is GS-16 rolled?
Ans.
4. In what direction is the flow for F-32?
Ans.
5. How far AMA would you locate GS-9?
Ans.
6. How far AMA and how far off C_L would you locate GS-75-GA-04?
Ans.
7. What two pipes service GS-12?
Ans.
8. How far fwd or aft is FS-75-GA-04 located?
Ans.
9. What turbine does P26-2 service?
Ans.
10. How far Port or Stbd of C_L is P70-2 located?
Ans.
11. What does the FL-2 attached to P24-2 connect to?
Ans.
12. What type and size fitting is F-17?
Ans.
13. Give all locations to attach F-10 to P14-2 and P14-3.
Ans.
14. What is the distance between F-11 and GS-24?
Ans.
15. What items are required to attach P14-1 to P18-3?
Ans.

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87742-1302 R/E

1. In which direction is the flow on GS-6?
Ans. Fwd.
2. What type of valve is GS-24?
Ans. Valve Angle Relief
3. How far off the horizontal is GS-16 rolled?
Ans. 45 Degrees
4. In what direction is the flow for F-32?
Ans. Fwd.
5. How far AMA would you locate GS-9?
Ans. 100.25 Abv. Ref to MA
6. How far AMA and how far off C_L would you locate GS-75-GA-04?
Ans. 93.5 Abv. Ref to MA- 114.9 Port of Ref to C_L
7. What two pipes service GS-12?
Ans. P30-1 & P30-2
8. How far fwd or aft is FS-75-GA-04 located?
Ans. 17' 3" Fwd of Ref to RFR
9. What turbine does P26-2 service?
Ans. Propulsion Turbine No.2
10. How far Port or Stbd of C_L is P70-2 located?
Ans. 107.5"
11. What does the FL-2 attached to P24-2 connect to?
Ans. Ref. Piping Steam Connection Ref 30
12. What type and size fitting is F-17?
Ans. Reducer Concentric 4.00 X 3.00 IPS Sch 80
13. Give all locations to attach F-10 to P14-2 and P14-3.
Ans. 24.3"AMA, 1'2"Port, 21'7.6"Fwd Ref to RFR
14. What is the distance between F-11 and GS-24?
Ans. 6.25"
15. What items are required to attach P14-1 to P18-3?
Ans. F-17 & F-15

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number
Lesson

Materials Required:

Material Number 87744-3004 R/G

1. What type of valve is CF-135?
Ans. ~~Valve is CF-135.~~
Ans. ~~CF-135.~~
2. What pump does P352-1 connect to?
Ans. ~~Pump P352-1.~~
Ans. ~~Pump P352-1.~~
3. What size pipe is P128-3?
Ans. ~~Size of P128-3.~~
Ans. ~~P128-3.~~
4. What pipes does H48-4 support?
Ans. ~~Pipes H48-4.~~
Ans. ~~H48-4.~~
5. What is the distance between H13-4 and H1-4?
Ans. ~~Distance between H13-4 and H1-4.~~
Ans. ~~H13-4 and H1-4.~~
6. Could partial section 18-A be used to facilitate installation?
Ans. ~~Partial section 18-A.~~
Ans. ~~18-A.~~
7. What type of Assy. is F-18?
Ans. ~~F-18.~~
8. What type and size end fittings are used for F-18?
Ans. ~~End fittings for F-18.~~
Ans. ~~F-18 Union Assy - 1 1/2".~~
9. On CF-130 what type and size fitting is FL-2?
Ans. ~~What type and size fitting is FL-2?~~
Ans. ~~Flange - 1 1/2".~~
10. What pipe does Ident hanger No.1 support?
Ans. ~~Ident hanger No.1 supports pipe.~~
Ans. ~~Pipe.~~
11. What is the Reference and Plan no. for hangers on this system?
Ans. ~~Reference and Plan no. for hangers on this system.~~
Ans. ~~Ref. S-FILE-7001.~~
12. To what two fittings does P140-1 attach?
Ans. ~~To what two fittings does P140-1 attach?~~
Ans. ~~F-6 & F-1.~~
13. What valve is used to feed CF-73-GA-58 gageboard?
Ans. ~~Valve is used to feed CF-73-GA-58 gageboard.~~
Ans. ~~CF-25.~~
14. In which direction is the flow for CF-138? (Fwd or Aft)
Ans. ~~Direction of flow for CF-138.~~
Ans. ~~Aft.~~
15. What is the Reference and Plan number for gageboards on this system?
Ans. ~~Reference and Plan number for gageboards on this system.~~
Ans. ~~S-FILE-7001.~~

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

87744-3004 R/G

1. What type of valve is CF-135?
Ans. Gate Valve
2. What pump does P352-1 connect to?
Ans. Main Feed Pump No. 2
3. What size pipe is P128-3?
Ans. 1.900OD X 0.134 Min
4. What pipes does H48-4 support?
Ans. P189-1, P135-1
5. What is the distance between H13-4 and H1-4?
Ans. 118.5"
6. Could partial section 18-A be used to facilitate installation?
Ans. No
7. What type of Assy. is F-18?
Ans. 90 degree Flex-Hose Assy.
8. What type and size end fittings are used for F-18?
Ans. F-12 Union Assy. - 2" IPS
9. On CF-130 what type and size fitting is FL-2?
Ans. Flange - 1.500 IPS
10. What pipe does Ident hanger No.1 support?
Ans. P307
11. What is the Reference and Plan no. for hangers on this system?
Ans. Ref. 5 87524-7503
12. To what two fittings does P140-1 attach?
Ans. F-8 & F-4
13. What valve is used to feed CF-73-GA-58 gageboard?
Ans. CF-254
14. In which direction is the flow for CF-138? (Fwd or Aft)
Ans. Aft
15. What is the Reference and Plan number for gageboards on this system?
Ans. Ref. 13 Plan No. 87728-1502

B-28 PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
Ans.
2. What type of valve is CF-152 used on the 729 Boat?
Ans.
3. How far port or stbd of C_L is F-14 located?
Ans.
4. To what pipe does F-31 attach?
Ans.
5. How far BMA would CF-331 be located?
Ans.
6. In what direction is the flow for CF-203?
Ans.
7. How far fwd of Fr. 113 would CF-331 be installed?
Ans.
8. After installation will CF-154 be locked open or closed?
Ans.
9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
Ans.
10. What is F-20 and how much is required?
Ans.
11. What size clamp half would be used on P157-2?
Ans.
12. Why is piping on this drawing insulated?
Ans.
13. What Reference and Plan would be used for the pipe details on this system?
Ans.
14. What does P168-2 and P162-6 connect into?
Ans.
15. What Reference and Plan numbers are used for the hangers on this system?
Ans.

B-28, PIPEHANGER BLUEPRINT READING

Lesson Number

Materials Required:

Drawing No. 87744-3002 R/G

1. How far BMA would you locate CF-153?
Ans. 16' 3" BMA
2. What type of valve is CF-152 used on the 729 Boat?
Ans. Globe Stop Check
3. How far port or stbd of C_L is F-14 located?
Ans. 2' 6"
4. To what pipe does F-31 attach?
Ans. P158
5. How far BMA would CF-331 be located?
Ans. 7' 9.2"
6. In what direction is the flow for CF-203?
Ans. Up
7. How far fwd of Fr. 113 would CF-331 be installed?
Ans. 18' 4.5"
8. After installation will CF-154 be locked open or closed?
Ans. Closed
9. How far fwd of Fr. 113 is the F-2 on P172-1 located?
Ans. 19' 1.5"
10. What is F-20 and how much is required?
Ans. Stave Damping - 22'
11. What size clamp half would be used on P157-2?
Ans. 2" IPS
12. Why is piping on this drawing insulated?
Ans. G.N. 37 Personnel Protection
13. What Reference and Plan would be used for the pipe details on this system?
Ans. Ref. 2 87744-3032
14. What does P168-2 and P162-6 connect into?
Ans. Feed Compound Tank
15. What Reference and Plan numbers are used for the hangers on this system?
Ans. Ref 11 & 25 87524-7502 & 87524-7504